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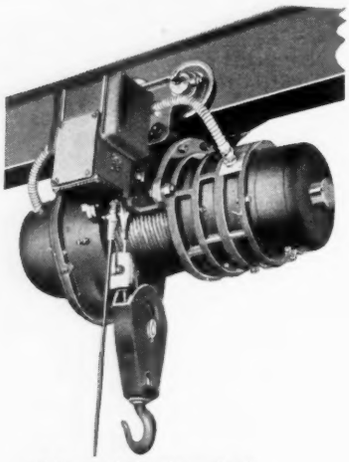

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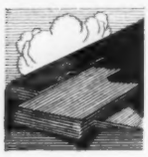

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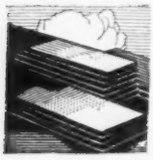

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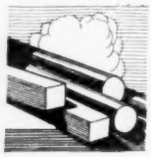

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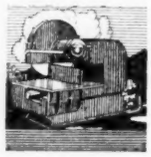

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STEEL-SERVICE

Volume 89 Number 16

STEEL

For forty-eight years—IRON TRADE REVIEW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

This Week in Steel

THERE is a legend, dating back to the first days of the Steel corporation, that when the elder Morgan with a skeptical inflection inquired of Charles M. Schwab concerning his million-dollar-a-year contract with the Carnegie Steel Co., Mr. Schwab responded by nonchalantly tearing up his contract. But even this magnificent gesture could not have afforded Mr. Schwab more satisfaction than he derived at Newark Tuesday when the largest and most enthusiastic Bethlehem Steel Corp. stockholders' meeting on record (Page 15) indicated a convincing majority was in favor of his bonus system.

On account of a court order obtained by the militant minority in Bethlehem the vindication was unofficial, but a 72 per cent favorable vote assured that the elder statesman of the steel industry had won another battle—one to which he had attached great importance. Because for several years he has been withdrawing from active participation in the steel industry this may be Mr. Schwab's last spectacular fight. Were he connected with the Steel corporation it could be said with certainty that it is, for he is now past 69 and the Corporation is about to make retirement at 70 compulsory.

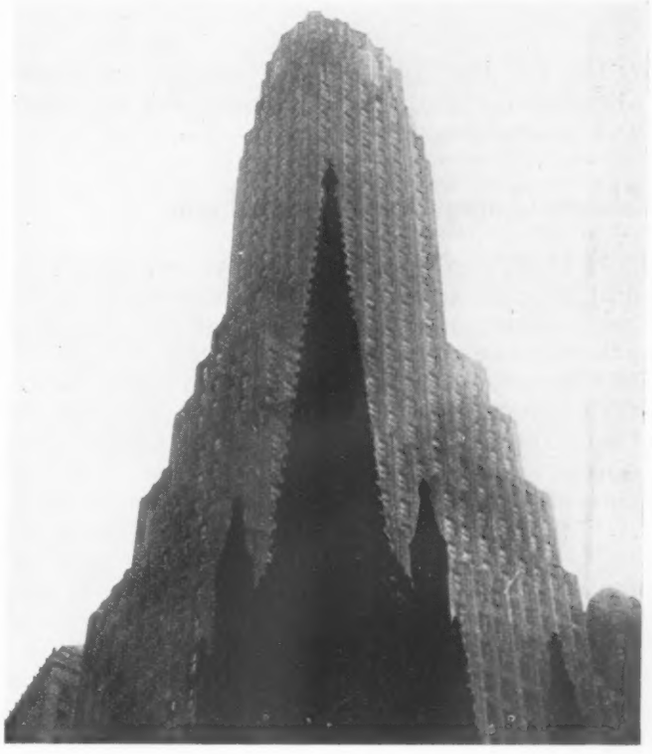
U. S. Steel To Be Young Man's Corporation

If stockholders of the Steel corporation vote next Monday (Page 17) to make 70 years the age limit—and such action appears probable—then the passing of five presidents in the next five years will be decreed. Also, with retirement at age 65 made optional, two more presidents of subsidiaries will shortly pass into the twilight zone.

First to retire will be James A. Farrell, president, in February, 1933. Had a 70-year deadline been in effect in Judge Gary's time he would have returned to Wheaton, Ill., in 1916, or 11 years before he was taken there. . . . But in the meantime science, which Mr. Schwab says (Page 16) will find jobs for all, may provide activity even for the septuagenarians of the steel industry.

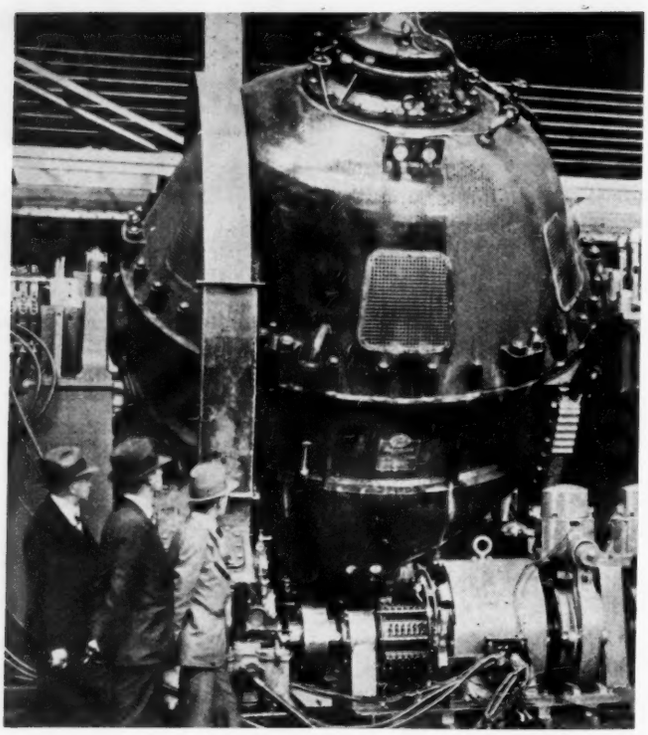
The Drift Is Always Downstream

Perhaps, though, if the iron and steel markets continue as colorless as in the past week many executives will welcome retirement. A few more freight cars have been ordered; structural inquiry is brisk; canners are taking tin plate with seasonal alacrity. But automotive specifications are unsubstantial and the general manufacturing lines are sluggish. On the whole



International Newsreel Photo

Big business, and Christian humility: The steeple cross of old Trinity church, New York, once gazed down upon surrounding buildings. Now it is overshadowed in a vast canyon of brick and steel. The structure in the background is Irving Trust Co.



Acme Photo

Steel routs mal de mer: This 55-ton gyro-stabilizer, built by the Westinghouse Electric & Mfg. Co. for Sperry Gyroscope Co., will keep a 450-foot ship within 2 degrees maximum roll

(Page 61) the markets are drifting; the scales are tipped slightly by mild reactions in orders and production.

Sheets Going Down with a Fight

In most steel products this drifting is a tranquil, even-tempered process, but in sheets it has been accompanied by great agitation concerning prices. The two sheet mills in the Detroit district have been drawn into an inevitable rivalry for business, resulting in what may easily flower into a Detroit base (Page 62). Competition may do for Detroit what the federal trade commission did for Chicago, Birmingham and Duluth. . . . In Europe the markets are unsatisfactory enough to call for the pulmotor on the steel entente. By a new quota system (Page 90) any overage in exports of steel may be canceled by a deficiency in domestic production. . . . Russia has ordered 25,000 tons of steel (Page 89) in Europe.

Costs Are Costs, Even in Soviet Russia

Stalin may apply the economic lash to Russia's millions but he cannot conscript low costs. A government analysis (Page 16) of the soviet's iron and steel situation in the final quarter of 1930 discloses production charges rising 2.5 per cent. It cost Russia $40 to make a ton of ingots; in the United States billets could be bought for $30. A ton of pig iron in the ladle cost Russia $25; the market in Europe was $14 and in the United States $17. . . . Russia, which set a record (Page 20) in 1930 by producing 1,444,166 tons of manganese ore, may take notice that in South Africa is a deposit of one billion tons of this ore (Page 42), with an easily-removed overburden and a low freight rate to the United States.

Insulation—Technical and Economic

To curb the dispersing proclivity of heat, insulation has been found (Page 35) of great benefit, especially in the open-hearth process where heat is time and money. A study of the various materials reveals a grade suitable for every class of equipment. . . . As an insulation against economic depression and a spur to the recovery of business, the former chairman of the federal farm board declares (Page 17) a healthy agriculture is unsurpassed. . . . Business sentiment at Chicago (Page 25) agrees that steel demand will not turn up until farm buying does. . . . To speed the recovery within its province the New England Council puts forward (Page 18) a program of 14 points.

Declaring a Dividend on the Scrap Heap

The most visionary alchemist never dreamed of transmuting metals into oil, yet one automobile manufacturer is reclaiming 140,000 gallons of oil annually from his turnings. In such economies are today's profits found—just one example of the prudent management being demonstrated this week (Page 19) at the materials handling exposition at Cleveland. . . . Still another example is the operation, under centralized control (Page 45), of two hydraulic automatic millers to machine both ends of elevator guide rails simultaneously. . . . Reduced costs and time are by-products of a centrifugal process of galvanizing, of special merit (Page 39) when test runs are impractical.

Markets May Be Bounding Off the Bottom

Even though steel operations are down (Page 68) and STEEL's market composite has fallen further (Page 61), he who runs may read plenty of optimistic news. The National Industrial Conference board believes (Page 28) the world-wide decline in commodity prices is arrested. . . . Freight car builders at Chicago believe (Page 25) fair equipment business will develop this fall. . . . Unfilled tonnage of the Steel corporation (Page 20) increased 30,136 tons. . . . Use of tin in tin and terne plate in March (Page 20) was almost equal to last March, showing a steady rise since last December.

Bethlehem Stockholders Vote for Bonus; Court Bars Record

A DECISIVE majority of stock of the Bethlehem Steel Corp. is favorable to the present bonus system of the corporation, it was indicated at the annual meeting of the corporation in Newark, N. J., Tuesday, April 14. The meet was the largest and most protracted in the history of the corporation.

Just prior to the meeting, Vice Chancellor Backes, of the New Jersey court, issued a formal restraining order which greatly changed the complexion of the proceedings and was favorable to the group of minority stockholders opposing the management in the bonus system controversy.

Court Prohibits Formal Record

This order permitted the corporation to tabulate the shares of stock voted at the meeting and the proxies sent in as a result of efforts of both the pro and anti forces—Charles M. Schwab, chairman, having made a special appeal for votes to sustain him—but prohibited it from formally making any official record of the result until permittted by the court. It was contended by the opposing forces that any stockholders' action should be deferred until the court proceedings have been concluded.

The stockholders' committee, in opposition, has a total of 487,043 shares of common and preferred. Bonus forces have 52,867 stockholders, holding 3,023,086 shares of common and preferred stock, or about 72 per cent of the stock outstanding. Of this total 2,288,357 are common shares and 734,729 preferred.

Chairman Schwab Cheered

Mr. Schwab dominated the meeting, which was attended by the largest number of Bethlehem stockholders ever assembled. The assemblage rose to its feet cheering as the chairman concluded an eloquent address in defense of the bonus system and its administration. It was an overwhelming display of confidence, and action favorable to the bonus insofar as the majority of stockholders were concerned appeared certain.

Mr. Schwab confined his remarks to two points: First, should the executives' bonus be calculated before or after deducting depreciation? Second, why it is fair that the corporation should pay executive bonuses during periods of depression, while not paying dividends on common stock. Mr. Schwab declared that to pay after deducting the amount of depreciation would be unfair in times of depression and also would work to the disadvantage of the corporation.

Opposition stockholders said today that they are not opposed to a bonus, in principle and practice, but they are against the present Bethlehem plan and its administration.

C. D. Marshall, of the McClintic-Marshall Corp., the recent structural steel acquisition of Bethlehem, was elected a director, succeeding James H. Ward. Retiring directors who were re-elected included W. E. Corey, F. A. Shick and Grayson M-P Murphy.

Nineteen thirty was the second best year in Bethlehem's history, said Eugene G. Grace, president, being exceeded only by 1926. At the close of the year the debt of Bethlehem was $117,000,000, compared with the high of $244,000,000 before the bond redemption.

Ingot Capacity Increased

Additions to property which resulted in an expenditure of $47,000,000 in 1930 and $14,000,000 for the current year will increase Bethlehem's ingot capacity by 1,200,000 tons, said Mr. race, giving it a total capacity of 10,000,000 tons. The new capacity gives Bethlehem ingots at a cost of $40 per ton, compared with $80 for some of the company's older capacity, according to Mr. Grace, apparently referring to capitalization and not actual production costs.

In the first quarter Bethlehem covered the full dividend requirement of the preferred stock and "we should have a little balance for the comman." Wage rates have been maintained, and work has been distributed among the most men possible.

History of the present bonus controversy dates back to the suit brought by Cyrus Eaton and associates in Youngstown, O., last year to enjoin the Bethlehem Steel Corp. and the Youngstown Sheet & Tube Co. from merging. Opponents of the proposed merger claimed inadequate information had been furnished Youngstown stockholders on several points, including the Bethlehem bonus plan. They contended that it was an overhead cost, before earnings, of an unusual nature—sufficiently unusual to warrant an explanation.

Deny Bonus Was Secret

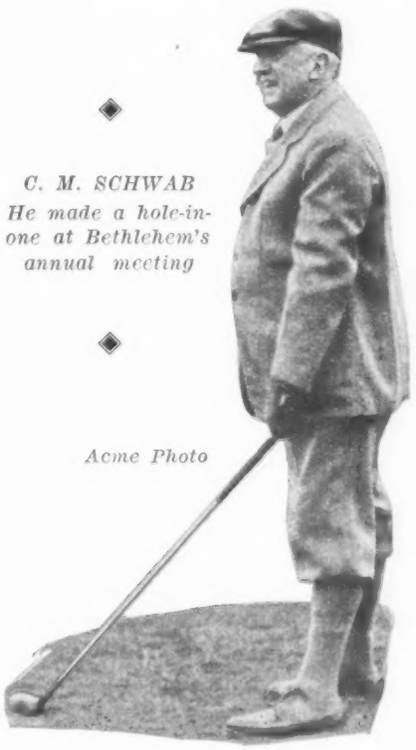
Certain directors of the Youngstown company testified they knew of the bonus system, but not of its details. Bethlehem replied that it was an administrative and selling expense that had been justified by the development of the company and that there had been no secrecy concerning its operation.

Judge David G. Jenkins, conducting the merger trial at Youngstown, held that the proper amount to be paid in bonuses was not the court's concern, but thought that the bonus plan had a bearing on the future of the transaction and hence the testimony should be admitted in the evidence. So far as its ultimate bearing on the case was concerned, it appears that it was simply one of several points which the judge considered, when he on Dec. 29, 1930, enjoined the merger, declaring that Youngstown directors had not informed themselves and each other sufficient of the terms proposed and all they involved. Incidentally, the appeal is scheduled to be heard in the circuit court of appeals at Youngstown, presumably in June, although the belief persists in certain unofficial quarters that a compromise may be effected.

Opposition Organized

Meanwhile, early last November, a group of stockholders who received Bethlehem stock when Midvale Steel & Ordnance was absorbed a few years ago began sounding out other Bethlehem stockholders on the bonus plan. This group was headed by Henry B. H. Ripley and Samuel D. Hopkins.

Then, in January, Camillus Berendt, New York, and three other stockholders filed suit in the Chancery court of New Jersey at Newark,



C. M. SCHWAB
He made a hole-in-one at Bethlehem's annual meeting

Acme Photo

demanding restitution of bonuses, amounting to $36,000,000 since 1911, and seeking to enjoin Bethlehem from making further bonus payments. The Midvale minority group joined in this action.

A few days later Mr. Schwab made a public announcement in which he, as chairman of the board, assumed entire responsibility for the planning and operation of the Bethlehem bonus system. He declared that it had been described in detail in the annual report of the corporation in 1916 and that he had made frequent public references to a profit sharing system which was yielding $1,000,000 a year to E. G. Grace, president of the corporation. Mr. Schwab asserted that in 1917 stockholders formally approved the system and at their annual meeting the following year adopted a by-law regulating its administration.

Shortly Mr. Schwab sent a letter to corporation stockholders augmenting these remarks. The bonus system was not a new policy in the steel industry, the letter stated. Similar incentive payments were originated nearly 50 years ago by Andrew Carnegie and when Mr. Schwab purchased the Bethlehem company in 1901 he adopted the principle, which had paid him as head of the Carnegie Steel Co. bonuses far in excess of those which he in turn, with the approval of the company, had paid Mr. Grace and other participating officers.

The value of this system to Bethlehem and to its stockholders has been proved, the letter said, by the fact that the company in the 26 years of its existence had grown from a small specialty concern to the second largest steel company in the world. It was pointed out that notwithstanding bonuses, the administrative, selling and general expense of the Bethlehem corporation was less per ton of steel sold than that of the United States Steel Corp. and Youngstown Sheet & Tube Co. He asked stockholders to ratify the bonus system at the annual meeting April 14.

Early in March Samuel D. Hopkins and others identified with the Midvale minority group filed petition in New York supreme court in an effort to obtain a list of Bethlehem stockholders. The Bethlehem corporation granted this request without protest.

A stockholders "protective committee" mailed letters later in that month to a large number of Bethlehem stockholders in which the bonus system was described as "most unseemly and improper" and criticising the plan to submit the bonus question to stockholders before the court had opportunity to pass upon the suit brought to recover bonus payments, a suit that has been frequently postponed, both sides contributing to the delay.

Schwab Lauds Science

"Looking to the future, I see in the further acceleration of science continuous jobs for our workers," declares Charles M. Schwab, chairman, Bethlehem Steel Corp., in an article, "Science Speeds-up Business," in *The Rotarian* for April.

"New industries will arise from our laboratories. Science has made necessary a new type of leadership. The business man and science, in short, have formed a partnership which is beneficial to each. The callings of both have grown in stature, thanks largely to the mutual aid which each has given the other."

Arbitrating Rail Merger

Remaining differences in the consolidation of eastern trunk lines into four main systems will be adjusted by a board of arbiters—Thomas W. Lamont, member of J. P. Morgan & Co.; George T. Slade, a director of the Hill railroads; and Thomas S. Gates, president of the University of Pennsylvania. It is believed that the consolidation program will be ready for presentation to the interstate commerce commission by June 1.

(Editor's Note: For details of 4-system eastern rail merger see STEEL for Jan. 8, page 15).

Riley, Badenhausen Merge

Riley Stoker Corp., Worcester, Mass., and the Badenhausen Corp., Cornwall Heights, Pa., have merged. The Riley corporation manufactures unit pulverizers, coal burners, stokers, automatic furnaces and similar equipment. The Badenhausen Corp.'s products include water cooled furnaces, preheaters, air heaters, ash conveyors, dust separators and insulated settings.

Withdraws Ore Lands

The Canadian government has set aside, pending further investigation, certain tracts on Belcher island in Hudson bay, believing these tracts to contain large deposits of high grade iron ore. The further development of an iron and steel industry in eastern Canada through a union of Ontario ore and Nova Scotia coal is visualized.

Russian Iron and Steel Costs Above American and World Selling Prices

RUSSIAN pig iron and steel do not appear likely to become competitive with the product of American stacks and mills or with those of Europe, on the basis of costs set forth in official publications of the U.S.S.R., as gathered by the department of commerce.

Not only are costs high but they also are increasing, instead of being lessened according to the plans laid out by the government.

Steelworks controlled by the Russian steel trust, Stal, failed in the quarter October-December, 1930, to meet the figures set by the production program, though they made increases over the preceding quarter. But it is regarded as more serious that costs increased 2.54 per cent instead of being reduced 6.1 per cent, as planned. Some plants found increases of 7 to 8 per cent in cost of production.

Failure to bring down costs in the measure set by the 5-year plan is estimated to have caused a loss of 12,300,000 rubles, about $6,000,000. In pig iron the increase was due to failure to utilize to the full existing blast furnace capacity. This resulted from lack and poor quality of ore, coke and limestone. This caused heavier consumption of coke and poorer quality of the pig iron turned out.

Cost of steel ingots at two important plants, representative of the best results attained, show that while for the fiscal year ending Sept. 30, 1930, the cost of a ton of steel ingot was 70.25 rubles, about $35, in the final quarter of 1930 this had risen to an average of 79.71 rubles, nearly $40. At another plant the average for the fiscal year was 73.49 rubles and for October and November it was 72.86 and 72.35 rubles, respectively. A ruble is about 50 cents.

These costs indicate that Russian steel is not likely to be a serious competitor to American steel, as semifinished steel is selling here at about $30 a gross ton. Unless cost is disregarded in selling the Russian product it is not competitive.

In pig iron the cost per ton at a representative plant was 50.56 rubles per ton for the fiscal year ending Sept. 30, 1930, while in October and November, 1930, it was 55.50 and 54.35 rubles, respectively. Thus, the Russian cost is $25 to $27.50 per ton, while comparative grades are selling in the United States at about $17. European and British iron is selling at between $14 and $15 for steelmaking grades.

Many Steel Corp. Heads Near Retirement By Proposed Plan

WITHIN five years the United States Steel Corp. and its subsidiaries will automatically retire five presidents, if the revised pension plan is ratified at the forthcoming meeting of stockholders.

As proposed by Myron C. Taylor, chairman of the finance committee, who has introduced similar stipulations in pension plans of other industries with which he has been affiliated, retirement of executives at the age of 70 years becomes compulsory, if they have not been already retired at their own request or that of their superiors at 65 years.

Under this plan James A. Farrell, president of the Steel corporation, will be retired Feb. 15, 1933. E. J. Buffington, president of Illinois Steel Co., under the plan, will follow March 14 of the same year. Others to be retired in 1933 include Joshua A. Hatfield, president of the American Bridge Co., June 11, and Ward B. Perley, president of the Canadian Steel Corp. Ltd., Ojibway, Ont., Dec. 7.

J. S. Keefe, president of the American Steel & Wire Co., reaches the retirement age Jan. 24, 1934, and E. W. Pargny, president of the American Sheet & Tin Plate Co., June 5, 1936. Mr. Taylor, who has proposed the retirement plan, will reach the age of 70 years Jan. 18, 1944.

Younger executives of the Steel corporation subsidiaries include F. W. Waterman, president of the National Tube Co., who reaches 70 years in 1947; I. Lamont Hughes, president of the Carnegie Steel Co., in 1948; and L. C. Reis, president of the Minnesota Steel Co., in 1951.

It is interesting to note that if such a plan had been in effect during the life of Judge Elbert H. Gary, he would have had to relinquish the duties of chairman Oct. 8, 1916, or more than ten years prior to his death, Aug. 15, 1927.

Provisions for Women Employes

Under the provisions of the plan every male employe in service for 25 years or longer will retire at the age of 70, unless retired at his own request or the request of his superiors at the age of 65. Women who have worked continuously for 25 years will be retired at 60 or they may retire at their own wish or that of their employing officers at 55.

Each pensioner is to receive 1 per cent of the average annual salary received during the last ten years of employment multiplied by the number of years of service. Pension payments are made from the United States Steel and Carnegie Pension fund, established in 1910.

Retirement Dates Under Proposed Corporation Plan

James A. Farrell, president, United States Steel Corp. ....Feb. 15, 1933
E. J. Buffington, president, Illinois Steel Co. .....March 14, 1933
Joshua A. Hatfield, president, American Bridge Co..June 11, 1933
Ward B. Perley, president, Canadian Steel Corp. Ltd. Dec. 7, 1933
J. S. Keefe, president, American Steel & Wire Co. ....Jan. 24, 1934
E. W. Pargny, president, American Sheet & Tin Plate Co., ... June 5, 1936
A. F. Harvey, president, Pittsburgh Steamship Co. .....Feb. 3, 1941
Myron C. Taylor, chairman, finance committee, United States Steel Corp. .....Jan. 18, 1944
F. W. Waterman, president, National Tube Co. 1947
I. Lamont Hughes, president, Carnegie Steel Co. .....Jan. 25, 1948
L. C. Reis, president, Minnesota Steel Co. .....Jan. 20, 1951
H. C. Ryding, president, Tennessee Coal, Iron & Railroad Co., not available.

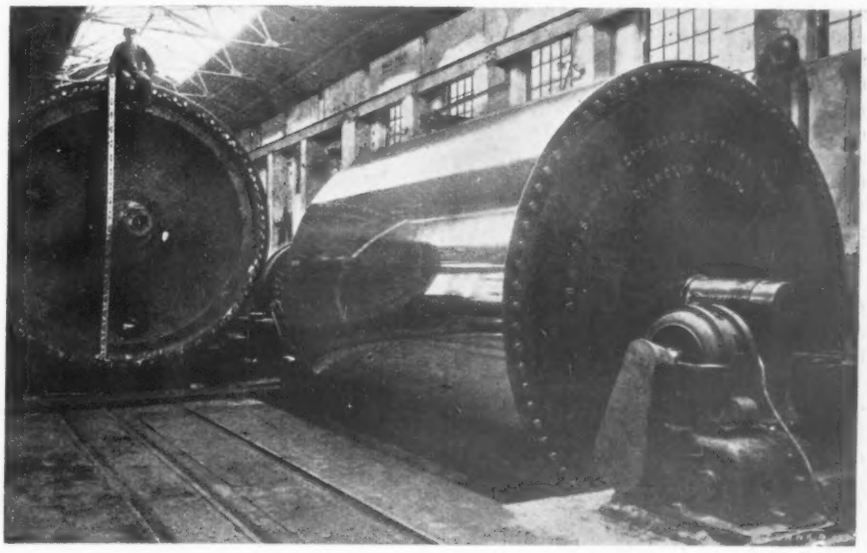
Says Agriculture Is Key to Business Recovery

Chicago — Recovery in business must await improvement of farm buying power, declared Alexander Legge, president, International Harvester Co., in a recent address before the Junior chamber of commerce. Mr. Legge, who for 20 months was chairman of the federal farm board, asserted the board is far from dead and that it has succeeded in helping to organize agriculture as an industry.

"We are confronted not with an agricultural problem, but with a national problem which must be solved before prosperity returns," Mr. Legge said. "Every citizen, no matter what his calling, must be interested in this situation. The moment agricultural buying power is restored, the business depression will be over. The trouble with agriculture is that it is an unorganized enterprise trying to compete with a more highly organized commercial group. This unequal competition results in overproduction and an inadequate cash income."

Offers Prize in Waste Elimination Contest

An award of $50 again is offered by the National Industrial exposition for the best suggestion on any phase of waste elimination in industry. The suggestion, with a sketch if necessary is to be submitted in a letter containing not over 500 words showing how the idea can be carried out and



—*Acme photo*

PONDEROUS POLISHED STEEL ROLLS SMOOTH PAPER

Each of these paper smoothing rolls just completed at the Karlstad Mechanical Works, Vermland, Sweden, weighs 4700 metric tons. They are reported to be the largest of their type in the world

its savings. The award is to be made on the basis of quality of suggestion and greatest practical use to American industry.

All suggestions are to be the property of the Midwestern Engineering Exposition Inc. and must be in the office of the National Industrial exposition, 308 West Washington street, Chicago, not later than May 30.

Sloops Are Largely Alloys

Chrome molybdenum steel will be used for the masts of three racing sloops being built by the Glen L. Martin Co., Baltimore, for members of the New York Yacht club. Duralumin, made more corrosion-resistant by a bath in chromic acid will be used for the hulls. Turnbuckles will be an alloy of chrome steel. Monel metal also will be used.

Surveys Heating Boilers

Washington—The bureau of standards is distributing the report of a survey on varieties of low pressure steel heating boilers, conducted preliminary to an effort to establish a simplified practice recommendation for this industry.

Financial News of Steel Industry

NATIONAL STEEL CORP., Pittsburgh, is offering $40,000000 first mortgage, 5 per cent sinking fund bonds, due April 1, 1956, through a large banking group. The funds will be used to finance recently completed extensions to plant properties and will afford a sum of working capital.

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Cleveland Cliffs Iron Co., Cleveland, net profit was $4,886,150 in 1930, compared with $6,046,105 in 1929. This includes the acquisition of the majority interest of the Corrigan, McKinney Steel Co., and also an interest in Oglebay, Norton & Co., Cleveland.

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American Forging & Socket Co., Pontiac, Mich., has declared regular quarterly of 15 cents a share, payable May 1 to record April 25.

Drawback on Rail Steel

Washington—The treasury department has allowed a drawback on steel products manufactured by the Buffalo Steel Co., Tonawanda, N. Y., with the use of imported scrap steel rails.

New England Council Recommends Working Plan

Fourteen recommendations made by 739 New England business and industrial executives for a working program for 1931 have been distributed to 5000 New England manufacturers and to several thousand other business men by the New England council, Boston. In the order of their importance, as indicated by the relative frequency with which they were recommended in replies to a questionnaire they are:

Hold lay-offs to a minimum by eliminating overtime, and then reducing weekly hours; merchandise aggressively; improve employe morale by keeping workers informed and by various other means; encourage normal buying for normal needs by those with a steady income; clean up, repair and do general housecleaning; overhaul machinery and equipment; adopt research; develop plant modernization programs; invite employe suggestions for eliminating waste; plan and budget profits, sales and production; establish adequate standards of quality, value and especially performance, with suitable incentive and rewards for attainment and maintenance; co-operate with community in registration of unemployed with regard to relative need for work; encourage accurate publicity; and encourage exchange of information between communities on opportunities for work.

Executives Accept Cut

Operating, sales and executive officials of the Colorado Fuel & Iron Co., Denver and Pueblo, Colo., receiving more than a stipulated amount per year, have agreed to a salary reduction of 10 per cent, effective April 15. More than 100 are affected. Mill and clerical employes are unchanged.

Scullin Re-employs 125

Scullin Steel Co., St. Louis, has re-employed about 125 men, all former employes, on account of an increase in business. Harry Scullin, president, forecasts slow but steady improvement in demand for iron and steel.

Name Park for Stackhouse

Bethlehem Steel Co. and Cambria Iron Co. have donated 248 acres in Johnstown, Pa., for a public park, to be known as the Powell Stackhouse park in honor of the former Cambria executive.

Antitrust Laws in Greater Disfavor; Business News of Washington

SENTIMENT that the antitrust laws should be revised is more freely expressed. Senator Nye, of North Dakota, the most recent convert, states: "A study of these laws in the light of present-day economics leads me more and more to the conclusion that in many respects they have become antiquated and have lost their usefulness." It is under these laws that the department of justice recently acted against the Bolt, Nut and Rivet Manufacturers' association, and is now investigating the stable market on steel rails.

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In view of the number and importance of investigations undertaken by the tariff commission under the flexible provisions of the present tariff act and the desirability of securing, wherever they are readily ascertainable, foreign costs of production in the principal competing countries, the commission has strengthened and augmented its staff in Europe.

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Hay forks and manure forks have been added by the tariff commission to the list of agricultural hand tools being investigated.

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Treasury department has announced allowance of drawback on manganese sinter manufactured by the Alan Wood Steel Co., Conshohocken, Pa., with the use of imported manganese ore.

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Division 3, interstate commerce commission, has heard final argument in the commission's investigation into rates on iron and steel articles from points in the South to trunk line and New England territories. A tentative decision was rendered some time ago in this case by an examiner, in which he found that the proposed rates on iron and steel articles from Birmingham, Ala., and other southern points to trunk line, New England and Buffalo-Pittsburgh territories were not justified.

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Information reaching the department of commerce indicates that Russia is making fresh efforts to expand its policy placing trade on a barter basis and eliminating the use of coin or currency as a medium of exchange.

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Ethelbert Stewart, of the bureau of labor statistics, department of labor, believes that an agreement among industrial leaders to increase wages would bring a greater measure of prosperity.

Engineers Seek Economy as An Aid to Prosperity

MATERIALS handling, maintenance and management are subjects engaging the attention of several hundred engineers gathered in Cleveland this week to attend the National Industrial Congress and Equipment Exposition in Public auditorium. Judging by attendance at technical sessions and interest in exhibits, American industry is emerging from the depression fully recognizing that to be successful in the strenuous competition ahead, business enterprises must effect economy in every possible direction.

To assist in the reconstruction program, is the function of the congress and exhibition, sponsored by the American Society of Mechanical Engineers and Society of Industrial Engineers. Eighteen sessions are scheduled, at which nearly 50 technical papers on a wide range of subjects are to be presented and discussed.

Scrap Economies Explained

Scrap handling was the theme of the opening session on Monday afternoon, a session conducted under the auspices of the elimination of waste committee of the American Society of Mechanical Engineers and American Management association. Numerous economies were pointed out at this time.

For example, a recent improvement made at a tin plate mill in this country has reduced the cost of handling loose scrap at the squaring shears. As explained by H. H. Giles, American Sheet & Tin Plate Co., Monessen, Pa., the squaring shears were turned around to permit boxes to be lowered into pits in the floor.

The scrap from the shears drops by gravity directly into the box and since the box is in position to be handled by an overhead crane, the need for the services of the shear tenders is eliminated and a consequent saving effected. Installation of this system showed a saving of over 25 cents a ton of scrap handled, compared with the method previously used.

The cost of bundling thin unannealed sheet scrap from the hot mill not including overhead, depreciation, interest on investment, etc., as mentioned by Mr. Giles, generally is about 50 cents a ton. The cost of delivering loose scrap to the baling press runs from 20 to 50 cents a ton, depending on the system of handling used, and local conditions, such as the location of the shear, press and loading tracks, availability of overhead cranes, etc. In baling scrap the density of the bale should run from 0.080 to 0.110-pound per cubic inch or about one-third that of solid steel.

During 1929, about 9875 gross tons of metal scrap was baled by an automobile company, representing a return on the investment of 150 per cent, according to R. R. Rees, manager, Packard Motor Car Co., Detroit. In addition to the financial return, Mr. Rees pointed out that considerable floor space was conserved because of the large area taken up by the excessive bulk of scrap steel under the original method.

Oil Is Reclaimed

During the same year, 2414 tons of cast-iron briquets were produced, representing a net return on the investment of 85 per cent. In addition, there was an indirect saving represented by six men necessary under the original plan for the removal of borings from machines and the long trucking to the central salvage station. The quantity of oil reclaimed from steel turnings in the Packard plant amounts to 140,000 gallons a year and represents a net return of 18 per cent on the investment, the speaker stated.

The duplex process of steel melting now is under experimentation at the Packard plant and if found successful, all scrap made at the plant will be used by the company instead of being shipped to outside sources.

By far the greater percentage of cast-iron borings made in this country are sent to the blast furnace while only a part of the steel turnings are remelted in steel furnaces, according to A. K. Nowak, district manager, Baldwin-Southwark Corp., Chicago. Steel turnings in briquet form have a density of 65 to 70 per cent as compared with solid steel.

The annual net savings afforded by briqueting steel turnings is equivalent to 67 per cent return on the investment, and with cast-iron borings the saving is even more pronounced, according to Mr. Nowak.

Approximately 100 manufacturers of equipment classified under the headings of materials handling, plant maintenance, power transmission, management and production control and factory operation requisites are represented in the exposition. A considerable portion of this equipment, elaborate in nature, is in operation, thereby affording demonstration under assimilated shop conditions.

The exhibition and congress will continue until April 18.

Tell How Pittsburgh Aids Automobiles and Aviation

Pittsburgh's contributions to the automotive and aviation industries provided the subject for discussion at a joint meeting of the Pittsburgh section, Society of Automotive Engineers, and the Pittsburgh chamber of commerce, April 9. Frank J. Lanahan, president, Fort Pitt Malleable Iron Co., McKees Rocks, Pa., was toastmaster.

Speakers included W. B. Todd, manager of sales, Jones & Laughlin Steel Corp.; S. M. Kintner, assistant vice president, Westinghouse Electric & Mfg. Co.; H. V. Churchill, chief chemist, Aluminum Co. of America; John M. Orr, chairman of the Pittsburgh section; F. K. Lind, vice president, and John A. C. Warner, general manager of the society.

—International Newsreel photo

HOOVER DAM BUILDERS MAKING READY TO USE 100,000 TONS OF STEEL

A busy scene in the Boulder City, Nev., railroad yards where train after train rolls in loaded with machinery and materials for the Hoover dam, on the Colorado river. A miniature city has grown up in a few months on a barren stretch of land. Actually more than 100,000 tons of steel will be used in the construction of the dam; 52,000 tons is required for the contracts already awarded

Shapes Help Boost Steel Corp. Unfilled Tonnage

Large structural orders, including 125,000 tons for the Metropolitan Square-Radio City project in New York and part of the Pennsylvania railroad improvement, plus somewhat reduced production enabled the United States Steel Corp. to report a slight gain—30,136 tons or 0.73 per cent—in its unfilled tonnage as of March 31. Comparisons follow:

1930			
Jan. 31	4,468,710	51,517+	1.20+
Feb. 28	4,479,748	11,038+	0.25+
Mar. 31	4,570,653	90,905+	2.03+
April 30	4,354,220	216,433—	4.73—
May 31	4,059,227	294,993—	6.78—
June 30	3,968,064	91,163—	2.24—
July 31	4,022,055	53,991+	1.36+
Aug. 31	3,580,204	441,851—	10.9 —
Sept. 30	3,424,338	155,866—	4.35—
Oct. 31	3,481,763	57,425+	1.68+
Nov. 30	3,639,636	157,873+	4.53+
Dec. 31	3,943,596	303,960+	8.35+
1931			
Jan. 31	4,132,351	188,755+	4.78+
Feb. 28	3,965,194	167,157—	4.04—
Mar. 31	3,995,330	30,136+	0.73+

Locomotive Orders and Shipments Ease in March

Both shipments and unfilled orders for domestic use for railroad locomotives declined from the February levels, but a gain was noted in unfilled orders for foreign steam classes. Three-month totals, also by the department of commerce compilation, lag behind corresponding figures for 1930. Following shows comparison:

	Shipments		Unfilled Orders	
	Domestic	Foreign	Domestic	Foreign
1930				
March	66	4	530	6
(3 mos.)	179	8	.....	.....
April	94	3	462	7
May	56	2	411	9
June	80	1	335	8
July	55	1	284	7
Aug.	73	4	229	5
Sept.	65	.....	169	5
Oct.	50	.....	127	5
Nov.	43	.....	88	5
Dec.	44	5	104	.....
(Year)	739	24	.....	.....
1931				
Jan.	16	.....	90	1
Feb.	15	.....	92	11
March	10	.....	83	12
(3 mos.)	41	.....	.....	.....

Trucks and Tractors Show Material Gains

March shipments from plants of ten leading manufacturers of electrical trucks and tractors consisted of 93 units, compared with 56 in February. Improvement was to be noted largely in domestic shipments, as the following department of commerce table reveals:

		Shipment	
1930	Total	Domestic	Export
March	123	109	14
(3 mos.)	386	348	38
April	106	101	5
May	144	125	19
June	95	63	32
July	108	99	9
August	92	81	11
September	81	75	6
October	93	90	3
November	45	36	9
December	51	42	9
(Year)	1,191	1,050	141
1931			
January	38	33	5
February	56	50	6
March	93	84	9
(3 mos.)	187	167	20

Shipments of Enameled Ware Continue Improvement

Shipments of enameled sheet metal ware increased in Feburary. Reports of 80 per cent of the industry show 289,205 dozens shipped, compared with 267,232 dozens in January. Increases were shown in each classification, according to department of commerce compilation following:

In Dozens

	Total	White	Gray and Colored
1930			
Feb.	331,915	120,523	211,392
(2 mos.)	664,061	231,281	432,780
March	341,372	124,856	216,516
April	318,431	124,562	193,869
May	290,617	114,709	175,908
June	247,861	90,151	157,710
July	213,420	70,718	142,702
Aug.	309,645	89,259	220,386
Sept.	297,622	97,262	200,360
Oct.	329,337	107,553	221,784
Nov.	263,365	79,719	183,646
Dec.	250,568	70,554	180,014
(Year)	3,526,299	1,200,624	2,325,675
1931			
Jan.	267,232	84,917	182,315
Feb.	289,205	96,812	192,393
(2 mos.)	556,437	181,729	374,708

Tin Consumption Shows Good Gain in March

New York—Consumption of tin in the manufacture of tin and terne plate has recovered from the low point of 1400 tons last November to 2500 tons in March. This estimate by the American Bureau of Metal Statistics leaves March 100 tons behind the figure of a year ago, and for the first quarter the total of 6600 tons is 900 tons short of a year ago.

Increasing consumption in the tin plate industry from the autumn to the spring is seasonal, with consumption in April or May usually surpassing that of March.

The bureau estimates production of tin plate in the United States in March at 167,400 long tons, or less than 4000 tons short of the March, 1930 total. This means that production in March was very close to the average monthly production of the past few years. In January production was 24,000 tons short of the figure of a year earlier.

Galvanized Sheet Ware Best in Ten Months

February production of pails and tubs reached the highest level since April of 1930, though shipments eased off slightly. Production in the other ware classification also was improved, according to the following department of commerce figures:

In Dozens

	Pails and Tubs		Other Ware
	Production	Shipments	Production
1930			
Feb.	119,739	129,853	35,121
(2 mos.)	265,327	284,584	69,103
March	135,178	135,602	37,963
April	131,015	120,552	44,058
May	113,645	107,496	44,405
June	89,982	82,956	40,646
July	91,879	104,096	42,056
Aug.	103,050	103,354	46,730
Sept.	103,177	116,875	38,218
Oct.	130,906	115,185	40,084
Nov.	60,798	68,330	16,061
Dec.	87,140	68,898	21,657
(Year)	1,309,097	1,307,928	440,981
1931			
Jan.	103,677	133,977	23,716
Feb.	132,781	120,723	34,347
(2 mos.)	236,458	254,700	58,063

Soviet Manganese a Record at 1,444,166 Tons

Washington—Production of manganese ores in soviet Russia in the year ended Sept. 30, 1930, made a record of 1,444,166 metric tons of concentrated ore, compared with 1,183,880 tons in the preceding year and 1,245,274 in 1913, according to soviet information received in the commerce department.

Exports were 874,518 tons in 1929-30, compared with 889,969 in 1928-29 and 1,192,790 in 1913. A considerable increase in domestic consumption of manganese is noted.

Amalgamated Association To Convene April 21

Wage contracts for the 12 months beginning July will be discussed at the fifty-sixth annual convention of the Amalgamated Association of Iron, Steel and Tin Workers in Reading, Pa., beginning April 21. Date for conferences with mill representatives have not been announced.

Industrial Men in the Day's News

Edward C. Bullard, Vice President and General Manager, the Bullard Co.

HE is number one of the third generation of his family to manage the increasingly important machine tool business of his company.

ENTERING governmental service upon graduation from college, he made an enviable World war record in the heavy artillery and ordnance divisions, United States army.

HONORABLY discharged in 1919, he entered the Bullard Co. plant to become thoroughly familiar with all its ramified workings.

FIRST of the third generation of Bullards to step into active management of the company founded by his grandfather, Edward Payson Bullard, 51 years ago, Edward C. Bullard, vice president and director of the Bullard Co., Bridgeport, Conn., was recently appointed general manager. In that capacity he succeeds his uncle, the late Stanley Hale Bullard. The appointment was noted in STEEL of April 2, page 30.

A native of Bridgeport, Edward C. Bullard obtained his higher education in Curtis school, Brookfield Centre, Conn., University school, Bridgeport, and Sheffield Scientific school of Yale university, graduating with high honors in each case. After leaving college in 1917 he was employed as a designer of tools and fixtures in the Bullard Engineering Works, Bridgeport, which at that time was manufacturing heavy guns for the United States government. In December, 1917, he was transferred to duty in the heavy artillery division, United States army. In February, 1918, he was transferred to the ordnance department and spent considerable time in Washington, New Haven, Conn., and Bridgeport, participating in various phases of ordnance work. Later that same year he was assigned to duty in the government's ordnance school at Erie Proving Grounds, O., where he remained until February, 1919.

Upon his honorable discharge from governmental service he returned home to Bridgeport to enter the employ of the Bullard Machine Tool Co., in the capacity of student engineer. He worked in the various departments of the shop, becoming thoroughly familiar with work in all divisions of the plant. In 1923 he was appointed assistant production manager, in which capacity he served until 1926, when another promotion took him from the shop to the engineering department as assistant to his father, Dudley B. Bullard, who then was chief mechanical engineer. In 1929 he was elected to the company's board of directors and in 1930 he was elected vice president. In the meantime, however, in 1929, he had been advanced from assistant mechanical engineer to engineer in charge of research and development. On March 28, 1931, he was appointed general manager to succeed Stanley H. Bullard.

BERTRAM D. QUARRIE has resigned as president of Oliver Iron & Steel Corp., Pittsburgh, after three years in that office. Graduating from Case School of Applied Science in 1903, Mr. Quarrie became affiliated with Grasselli Chemical Co., Cleveland, as chemist. He next served a large company as chemist at its Mesabi range iron ore mines, and then became chief chemist at a Milwaukee blast furnace. His next position was as chief chemist for Cleveland Furnace Co., Cleveland, where he advanced to blast furnace superintendent. He then became assistant superintendent of blast furnaces, Central furnaces, American Steel & Wire Co., Cleveland. After a 6-month connection as blast furnace superintendent for Inland Steel Co., Indiana Harbor, Ind., he returned to American Steel & Wire Co. to become superintendent of Central furnaces and then was transferred to its Newburg steel works, to succeed Henry A. Barren as general superintendent.

In July, 1922, he became general manager of Otis Steel Co., Cleveland, remaining about two years. He resigned to become vice president of Paper & Textile Machinery Co., successor to Sandusky Foundry & Machine Co., Sandusky, O., where he remained until April 1, 1928, when he was chosen president of the Oliver company.

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Adolph Rider Jr., who has been in charge of Atlanta, Ga., offices of Lukens Steel Co., Coatesville, Pa., has been placed in charge of the new sales offices just established in New Orleans, his native city, at 304 Pan American building. Lukens Steel Co. sold plates in New Orleans as early as 1835.

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W. R. Chamberlain has been appointed sales manager of Marine Steel Corp., Chrysler building, New York,

in charge of its corrosion and heat resistant alloy steel for marine work.

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J. M. Mercer, Tulsa, Okla., has been appointed mid-continent sales representative, wire fabric division, Wickwire Spencer Sales Corp., New York.

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A. A. Motherwell, formerly in charge of forging plants at Detroit and Flint, Mich., of General Motors Corp., has become affiliated with Standard Forgings Co., Chicago.

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Strickland Kneass Jr. has resigned as chief engineer, A. M. Byers Co., Pittsburgh and Ambridge, Pa., to become affiliated with Leif Lee Co., Pittsburgh, manufacturer of heating and ventilating equipment.

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J. B. Bartholomew, formerly western manager of sales engineers in the Chicago office of Bethlehem Steel Co., Bethlehem, Pa., has been appointed contract manager of the McClintic-Marshall Corp., Bethlehem, with headquarters in Chicago.

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Max Von Bernewitz, affiliated with the bureau of mines, Pittsburgh, and recently secretary of the Pittsburgh section, American Institute of Mining and Metallurgical Engineers, has been transferred to Washington, where he will continue his connection with the bureau of mines.

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I. L. Au Werter with headquarters at 2034 Dime Bank building, Detroit, has been named sales representative in Michigan territory east of Grand Rapids for Champion Rivet Co., Cleveland. He will also continue to represent Apollo Steel Co., Apollo, Pa., in a sales capacity.

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Charles O. Hadley, affiliated since November, 1929, with the United States Steel Corp., New York, resigned recently as secretary of its trade research bureau at Pittsburgh to engage in other lines. Mr. Hadley resigned early in 1929 as vice president in charge of sales of Alan Wood Iron & Steel Co., Philadelphia.

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Edwin T. Hall has been appointed manager of the Boston office at 45 Milk street of Sullivan Machinery Co., Chicago. He succeeds the late George H. Richey, whose death was noted in STEEL of April 9. Mr. Hall has been affiliated with the New England sales department of the Sullivan company for the past 15 years.

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H. G. Chandler, who since the Hart-Parr Co., Charles City, Iowa, became a part of the Oliver Farm Equipment Co., Chicago, has been active in branch organization work for the latter company at Minneapolis and South Bend, Ind., has been appointed manager of sales promotion work for Havana Metal Wheel Co., Havana, Ill. For many years Mr. Chandler was with the Hart-Parr Co., and prior to the merger into Oliver Farm Equipment Co., was northwest divisional sales manager.

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S. M. Jenkins, who for more than two years has represented in Cleveland as sales manager, the Armstrong Cork & Insulation Co., Pittsburgh, has been made assistant sales manager in charge of high temperature insulation. His headquarters will be in Lancaster, Pa., where he succeeds J. L. Allison now office manager.

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Louis H. Krieger has been appointed manager of the New Orleans warehouse and fabricating shop of Jones & Laughlin Steel Corp., Pittsburgh, which it recently purchased from Lukens Steel Co. Mr. Krieger has been assistant manager of the Chicago warehouse of Jones & Laughlin since 1926. He is a native of Louisville, Ky., was graduated from Purdue university in 1913 with a civil engineering degree, served with the thirty-fourth engineers in France and in 1919 became affiliated with Jones & Laughlin in Chicago.

Louis H. Krieger

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George P. Torrence, since 1928 vice president of Link-Belt Co., Chicago, in charge of its Indianapolis plant; Richard W. Yerkes, secretary-treasurer of the company, with which he has been identified since 1890, and Arthur L. Livermore, attorney, New York, were added to the Link-Belt directorate April 8, to increase the board from nine to twelve members.

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Alfred F. Howe, who since his retirement as vice president and general sales manager of the Borden Co., Warren, O., manufacturer of pipe cutting and other pipe tools, has been sales representative on the west coast for some eastern manufacturers, has again become identified with the Borden Co. He has been appointed western sales manager with headquarters at 717 Calmar avenue, Oakland, Calif. His territory includes the Pacific Coast as well as Nevada and Arizona.

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J. Morris Ireland, manager of the Cleveland office, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., for five years, has been appointed special representative.

F. G. Hickling, Pittsburgh, transportation manager of the Westinghouse central district, succeeds Mr. Ireland, and will have headquarters at 2209 Ashland road, Cleveland.

L. A. S. Wood has now under his supervision all lighting activities of the Westinghouse organization which recently were consolidated.

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W. D. Flannery, until recently vice president and director of K-G Welding & Cutting Co., New York, with which he had been identified since 1914, has been appointed manager of Harris Calorific Sales Co. of New York, with headquarters in New York. This company is an affiliate of Harris Calorific Co., Cleveland. Mr. Flannery is president of International Acetylene association, director of Gas Products association, and also is active in American Welding society.

E. N. Stevens, for the past three and a half years assistant sales manager in the welding division of Bastian-Blessing Co., Chicago, has been appointed assistant sales manager of Harris Calorific Sales Co. of New York, with headquarters in Cleveland.

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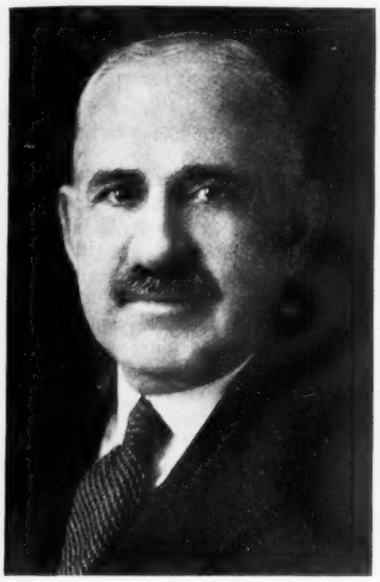
J. J. Baum, recently placed in charge of the development engineering department of the Steel Founders' Society of America Inc., New York, has had wide experience in many branches of the steel and alloy foundry business. He worked successively in sheet and tin plate mills, as civil engineer in steel mill construction and as checker and inspector of a merchant bar mill. After studying metallurgical engineering at Carnegie Institute of Technology, Pittsburgh, for more than four years, during which period he spent considerable time in research work for steel mills, including the Verona, Pa., plant of American Steel Foundries, he became chemist and metallurgist for National Alloy Steel Co., Blaw-Knox, Pa. Later he became identified with General Alloys Co., Boston, as sales and design engineer. He next went to Ohio Steel Foundry Co., Springfield, O., where his work embraced sales problems as well as metallurgical and development engineering. He has

(*Concluded on Page 65*)

Obituaries

JAMES B. BONNER, 68, Philadelphia sales manager of Carnegie Steel Co., Pittsburgh, ever since its formation in 1899, and prior to that Philadelphia representative of its predecessor, Carnegie Phipps & Co. Ltd., died April 9 following a brief illness. Born in Philadelphia, July 27, 1863, Mr. Bonner devoted more than 41 years to sales effort there and to the expediting of the handling of war orders during the World war. In April, 1917, he was transferred to Washington to assume charge of offices established by the United States Steel Corp., and later



James B. Bonner

was appointed vice chairman of the committee on steel distribution for American Iron and Steel institute. Under his supervision many millions of tons of steel orders were distributed. He was a member of a committee on manufactures for the sesquicentennial exposition held in Philadelphia in 1926.

Mr. Bonner was a member of the American Iron and Steel institute, the Academy of Political and Social Science, Union League and Metropolitan clubs.

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George C. Stone, 67, treasurer and manager of Clinton Foundry Co., of Clinton, Mass., died April 10.

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William H. Rehm, 65, president of Winslow Boiler & Engineering Co., Chicago, manufacturer of oil burning equipment, died April 7.

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Andrew E. Maccoun, 58, superintendent of blast furnaces, Edgar Thomson works, Carnegie Steel Co., Pittsburgh, died April 4. Mr. Maccoun joined the Carnegie Steel Co. in 1894 following his graduation from Johns Hopkins university. He was chairman of the blast furnace committee of the Carnegie Steel Co.

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Fred L. Bryant, 75, formerly president of Chicago Metal Works, Chicago, died March 26.

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James Spence, 60, of the James Spence Iron Foundry, Jersey City, N. J., died recently. He had engaged in the foundry business for 20 years.

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John W. Exler, 72, formerly president of James Lappan Mfg. Co., Pittsburgh, boilers, tanks, etc., died March 23.

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Walter T. Brown, 61, who prior to his retirement was affiliated with Columbus Mill & Mine Supply Co., Columbus, O., died April 10.

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Frank A. Estep, 82, former president of the R. D. Nuttall Co., Pittsburgh, died April 12 at St. Petersburg, Fla.

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Edwin P. Curtis, 87, manufacturer of agricultural implements, died recently at his home in Worcester, Mass.

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Raymond Burton, 41, formerly vice president and manager, Standard Steel Co., North Kansas City, Mo., died March 28 at Albuquerque, N. M.

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Lewis D. Newman, who has been secretary-treasurer and manager of the iron ore properties of Great Northern railway, St. Paul, since Carmi A. Thompson resigned from those duties, died March 28, while on a vacation in the West.

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Charles A. Bumpus, 80, who for 60 years had been identified with Cobb & Drew Inc., Plymouth, Mass., manufacturer of rivets, burrs, tacks, staples, etc., died March 23 at his home in that city. He was reputed to be the oldest tack and rivet maker in the country. Born in Plymouth he entered the employ of Cobb & Drew, rivet manufacturers.

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Marshall William Alworth, Duluth, prominent in the Lake Superior iron ore industry died March 31 at Miami, Fla. Mr. Alworth was president and director of Jasper Park Colleries Ltd., vice president and director of the Royal Mineral association, Alworth Land & Improvement Co., Alworth Investment Corp., Alworth Timber Co. and Nanoose Investment Co.

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Archibald G. Smith, 64, general superintendent of the Neville Island works, Davison Coke & Iron Co., Pittsburgh, died April 12 at his Warren, O., home. He formerly was superintendent of steel works of Columbia Steel Co., Butler, Pa., Trumbull Steel Co., Warren, O., and Allegheny Steel Co., Brackenridge, Pa.

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William Ganschow, 55, second vice president of Gears & Forgings Inc., Cleveland, died suddenly at Chicago,

William Ganschow

April 7, where he headed the Ganschow division of the company. His father founded William Ganschow Co., Chicago, to manufacture industrial gears more than 50 years ago. The son succeeded to the presidency upon the death of the elder Ganschow, continuing in that capacity until 1928 when the company merged with the Van Dorn & Dutton Co. and Ohio Forge Co., Cleveland, and Fawcus Machine Co., Pittsburgh, to form Gears & Forgings Inc. At that time he was placed in charge of Chicago operations of the merged interests.

Mr. Ganschow was affiliated with American Gear Manufacturers' association from its inception. He served as a member of its first general standardization committee and at one time was a member of its governing board. He also was active in National Metal Trades association.

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Harry B. Kirkland, 50, engineer and editor of *Railway Purchases and Stores*, Chicago, died April 3 at his

(*Concluded on Page* 71)

Here and There in Industry

JONES & LAUGHLIN STEEL CORP., Pittsburgh, has placed an order with the Rust Engineering Co., Pittsburgh, for two Rust zone controlled double-fired continuous billet heating furnaces for its Hazelwood plant. These furnaces each will have a capacity of 40 gross tons per hour of 4 x 4-inch to 6 x 6-inch billets 16½ feet in length. While designed for double or triple firing, the furnaces will be constructed originally for double firing. Coke oven gas will be used in the soaking chamber and fuel oil in the heating chamber.

Rust Engineering Co., also has received a contract for a double-fired continuous billet heating furnace from the Great Lakes Steel Corp., Detroit, to serve its new No. 2 merchant mill. The furnace will have a capacity of 40 gross tons per hour of 30-inch billets from 2 x 2-inch to 4 x 4-inch section. It is equipped with a Rust refractory tile recuperator to preheat air for combustion and a high-temperature exhauster to deliver the preheated air under pressure to the ports. Fuel will be oil.

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Fedders Mfg. Co., Buffalo, producers of automobile radiators, commercial refrigeration and heat units, will open a Canadian branch at 1244 Dufferin street, Toronto, about May 1.

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Bridge & Beach Mfg. Co., St. Louis, manufacturer of ranges and furnaces, plans reorganization and resumption of business on a smaller scale after trustee's sale of its real estate and buildings April 20.

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American Steel & Wire Co., subsidiary of the United States Steel Corp., has bought the business and smelting plant of the Edgar Zinc Co., St. Louis. The smelter is at Cherryvale, Kans.

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California Corrugated Tank Co., West Berkeley, Calif., has bought the plant and business of the Spokane Culvert & Tank Co., Spokane. The purchase also includes the Pure Iron Culvert & Mfg. Co., Portland, Oreg.

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Alco Products Inc., a division of American Locomotive Co., New York, has opened a district sales and construction office at 1203 Philtower building, Tulsa, Okla. M. A. Hayes is general superintendent in charge of construction and T. B. Leech is sales engineer. A similar office has been opened in the Esperson building, Houston, Tex., in charge of R. H. Brinton.

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Globe-Union Mfg. Co., Milwaukee, manufacturer of radio specialties and storage batteries, has bought the Great Lakes Golf Corp., Milwaukee, manufacturer of steel shafted golf clubs, by exchange of stock, the company retaining its identity.

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Guiberson Corp., Dallas, Tex., S. A. Guiberson, president, will establish a factory in Dallas for the manufacture of diesel airplane motors. The company manufactures oil well equipment and it is understood the new plant will be built adjoining the present plant at Dallas.

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Ingersoll-Rand Co., New York, has taken a contract from Six Companies Inc., contractor for the Hoover dam, for all air compressor and rock drilling equipment needed for the five-year project. The stationary plant will have capacity of 25,000 cubic feet per minute.

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Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., has appointed the Elliott Electric Co., 2178 West Twenty-fifth street, Cleveland, and A. G. Acker, 1409 Keystone building, Pittsburgh, its representatives for the sale of electric hoists and winches.

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Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has re-elected directors whose terms expired this year, as follows: E. M. Herr, vice chairman, and L. A. Osborne, vice president of the company; H. B. Rust, president, Koppers Co.; Samuel M. Vauclain, chairman, Baldwin Locomotive Works.

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Ralston Steel Car Co., Columbus, O., has re-elected officers for the ensuing year. Francis E. Symons has been continued as president, F. A. Livingston, vice president and treasurer; L. C. Roy, secretary and assistant treasurer; B. C. Hanna, chief engineer and assistant to the president; A. C. Case, auditor; H. E. Grashel, purchasing agent; C. L. Fox, works manager; Edward C. Turner, general counsel.

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Stinson Aircraft Corp., subsidiary of the Cord Corp., has plans for the production of about 400 planes in 1931, 50 of which will be tri-motored ships for commercial transport use, and 350 of which will be four-passenger junior planes. E. A. Stinson, president, states that the company now is building three to five of the smaller planes daily and two tri-motored ships weekly.

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General Lock Corp., Lancaster, Pa., has been formed to manufacture laminated steel padlocks. Van B. Hooper, Milwaukee, has been elected president, and Charles G. Crabb, also of Milwaukee, executive vice-president. Both are former executives of the Master Lock Co., Milwaukee, pioneer manufacturer of laminated padlocks. Following their retirement from the Master Lock Co. Mr. Hooper and Mr. Crabb organized the General Grinder Corp., Milwaukee, to manufacture tool grinders and other mechanical devices. S. R. Slaymaker, Lancaster, Pa., is chairman of the new General Lock Corp. S. C. Slaymaker is treasurer, and W. Heyward Smith, secretary.

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Cleveland Formgrader Co., recently incorporated, has started production of paving equipment, to include formgraders, subgrade scrapers and straight-edges. Plant and general offices are at West 116th street and the Nickel Plate railroad. The firm is headed by T. W. Dieckmann, formerly sales manager of the paving division of the Lakewood Engineering Co., which about two years ago was merged with the Jaeger Machine Co., Columbus, O. Mr. Dieckmann is president and treasurer and also will direct advertising policies. J. G. Tullis, formerly in charge of production and assembly of paving equipment for the Lakewood company, is vice president. E. F. Schumacher, previously engineer of design of paving equipment for Lakewood Engineering, also is vice president. H. M. Toole, formerly purchasing agent of the Lakewood company, is secretary and assistant treasurer.

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Fifty new caterpillar-type gasoline-operated cranes have been purchased from Industrial-Brownhoist Corp., Cleveland, by Phillip T. King, 50 Church street, New York, for resale. These represent all of this type of equipment in stock at the Cleveland plant, which is to be consolidated with the works at Bay City, Mich. The property at Cleveland is being offered for sale, with the transfer of equipment and other items to Bay City expected to be completed by August. The crawler cranes range from 6½ tons, equipped with ½-cubic yard buckets, to 15 tons, equipped with buckets of ⅞ to 1⅛ cubic yards. The latter sizes are steel erection cranes and can carry booms up to 80 feet in length. Under terms of purchase, it is said, the sales department of Industrial-Brownhoist Corp. will confine its efforts to the corporation's other lines over the next few months.

Wesley Bowman Studio

Steel Angles from Chicago

CHICAGO

PLUS and minus signs are jumbled in a welter of trends as the steel industry at Chicago swings into the second quarter. Recently, more minus signs than pluses have been visible following the activity that passed for a rally in the first half of March.

Equipment sales offices and steel consumers are in a highly uncertain mood. How variable are the trends is illustrated by the finished steel contract orders at the close of first quarter, the heaviest in four months, and an accompanying sluggish flow of specifications that reduced the district's ingot output by 5 per cent. The lack of farm equipment business furnished the sour note in last month's prosperity chorus.

Look to Farms for New Buying in Volume

Much serious-minded thought expresses the idea that the business depression cannot be overcome until better farm buying power is restored. This is in line with the recent assertion of Alexander Legge, who has returned to the presidency of International Harvester Co. after 20 months as chairman of the federal farm board.

Therefore, it is reasoned that intervention of nature through good crop prospects in the next 90 days may bring a change, not only in sentiment but in activity. Mr. Legge and other farm equipment leaders hold that the farms offer America's greatest potential market for the products of the country's industry. Farm income declined approximately ten billion dollars last year.

Comes an answering concert to the effect that the talk of a good crop year is mockery in view of the existing world grain surplus, which may be expected to continue at least another year at an abnormal status. Coincidentally is cited the fact that Canada is carrying a surplus of 165,000,000 bushels of wheat and the United States a surplus of 275,000,000 to 300,000,000 bushels, against a normal surplus of about 125,000,000 bushels; that wheat and corn actually are selling at about 1 cent a pound.

On the other hand, even conservative implement manufacturers and dealers assert farm morale is on the upgrade instead of down, and that farm buying power, while likely to be limited, is just as likely to gain momentum.

It is stated also that the low tempo of implement production in the last 13 months will result in greater shortages in certain types of tools and machines than the industry ever experienced during any previous good year.

Furthermore, it is contended, existing inventories will be liquidated in no time with even a mild upturn in demand, and in the livestock areas markets for row crop equipment and farm tool specialties are virtually unimpaired.

Tremendous grain elevator capacity, particularly in the Chicago and Kansas City districts, is being constructed by Missouri Pacific, Wabash and other roads, besides grain corporations.

Implement Builders Going Into Slack Season

For the implement maker, the last four months have been a period of shelf-cleaning. This has been a trying period, but heavy inventories are being slowly reduced. In the meantime, the off season is approaching, and the western implement and tractor works are limping in production, or closing entirely for the next few months.

International Harvester has its plants in this district and at Rock Island, Ill., at three days a week, while the Milwaukee plant has been down for several weeks. A leading independent—Deere & Co.—in a few weeks will have four of its plants virtually down, except for intermittent production of hay tools. Two of the plants had been at capacity for over two months. J. I. Case, at Racine, Wis., is at two to three days.

Caterpillar Tractor Co., Peoria, Ill., will close down its huge tractor works shortly through May, June and probably July, except its shipping department, and for parts production. Oliver is closing its export program, has its Battle Creek, Mich., plant down, and is on limited schedule at Charles City and South Bend.

This situation, while in marked contrast with the period of 1924-29, is not alarming for late spring and summer off-production months.

Freight Car Shops Face Summer Without Orders

Western freight car shops will continue to gather dust for the next few months. All the car builders are hopeful of railroad rolling stock purchases by autumn, but this will have little or no effect on 1931 car shop business, as the normal 60 days of assembling materials, plus the building up of scattered staffs and organizations would extend actual operations into next year.

The last big car order placed late last year, the Santa Fe purchase of 1500 freight cars, is being delivered by Pressed Steel Car Co., General American Tank Car, American Car & Foundry and Pullman shops in this district and at St. Louis. This

(*Concluded on Page* 95)

EDITORIAL

Who Is Best Qualified To Advise on Wage Policy?

AMERICAN business is witnessing a unique debate on the policy of wages. Never before in the history of this country have leaders in industry, economics and finance expressed such divergent views on this important problem. Never has it been more difficult for the average manufacturer to determine what course he should pursue.

The contrast between the present conflict of ideas and the almost unanimous opinion which prevailed only 10 years ago is astounding. In 1921 when business was in a depressed state business executives were united in the belief that the situation called for reductions in wages. Drastic cuts were announced daily, and seldom was a dissenting voice raised against this action. In President Harding's unemployment conference, where the question of wage levels received careful attention, the only emphatic objection to general reduction came from the veteran Samuel Gompers. But even his attitude was weakened by the fact that many groups of labor voluntarily accepted wage cuts as a logical concomitant of the business depression.

This Is First Depression in Which Leaders Have Differed on Wages

No semblance of this unanimity remains today. The President of the United States, the heads of an impressive number of the largest corporations, the spokesmen of many of the most influential business and trade organizations and a few economists hold that wages should be maintained or that if reductions become imperative they be considered as a last resort. Arrayed against these proponents of maintained wages are other leaders—apparently in the minority and seemingly finding their chief support in the banking fraternity—who argue that wages should be cut at once.

The position of those who believe in immediate reductions is that wage levels should correspond more closely with the cost of living, that the required degree of deflation cannot be achieved until wage rates are brought into line with commodity prices, and that lower wages are necessary to reduce the cost of production so that profits can be made on present low prices. Moreover, those favoring wage cuts argue that self preservation should take precedence over the maintenance of a national policy that has not yet been fully tested and proved sound.

The proponents of high wages assert that a wave of reductions will affect mass buying power seriously at a time when further restrictions in consumption would retard business recovery. They also point to the fact that in reality the income of labor has declined since 1929 to a greater degree than the cost of living. A further contention is that the majority of manufacturers can save more by improved management than can be saved by reducing the cost of labor.

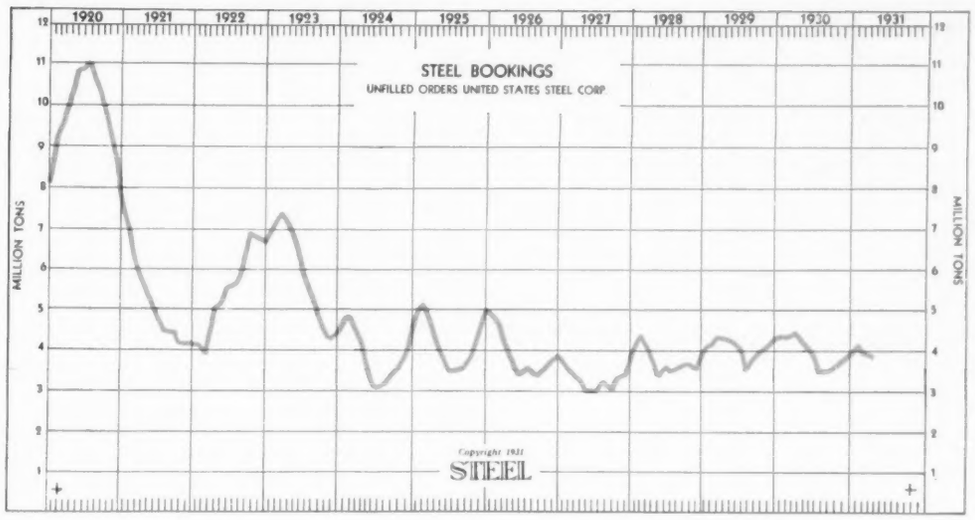
Business Should Choose Leadership Which Is Best Qualified

In view of the complexity of these conflicting arguments it is not surprising that industrial executives are puzzled as never before as to the proper course to pursue. That the disposition to yield to the temptation to cut is more prevalent now than at the beginning of the depression is clearly demonstrated by the statistics of the bureau of labor statistics of the United States department of labor. The figures show that in each month of 1929 the number of employes affected by wage increases greatly exceeded those affected by reductions. This also was true in January, 1930, but in February, 1930, and in each succeeding month to date the number of workers affected by wage cuts was greater than the number affected by wage increases.

While the figures plainly reveal a trend toward downward revision of wages, the tendency is not general. In fact industry as a whole has made a remarkable showing in its effort to maintain wages under extremely difficult circumstances. The United States Steel Corp. and most of the leading independents in the steel industry, the Standard Oil companies and a number of the independents in that field, American Telephone & Telegraph Co. and other leading employers of labor are trying to hold wages at 1929 levels.

It would seem that manufacturers who are confused by the conflicting elements in the wage debate might well consider the type of leadership they would prefer to follow. Then it becomes a choice between the judgment of the executive leaders of successful corporations and the judgment of bankers. The former, who are responsible not only to their stockholders, but also to tens of thousands of employes, and who are thoroughly familiar with questions of management, would appear to be better qualified to speak on wage problems than financial experts whose perspective necessarily is more limited.

THE BUSINESS TREND



Thousand Tons

1930

Mar. 4,570
Feb. 4,479
Jan. 4,469

1929

Dec. 4,417
Nov. 4,125

Thousand Tons

1931

Mar. 3,995
Feb. 3,965
Jan. 4,132

1930

Dec. 3,943
Nov. 3,639

Upturn in Building and Auto Industries Encouraging

BAROMETERS of business continue to present a confusing picture, but the general aspect is somewhat brighter. The statistics for March are serving the useful purpose of reminding the business world that the upswing through January and February continued throughout the third month without appreciable abatement.

Steel ingot production in March, with an average daily rate of 116,286 tons, represented a 10 per cent gain over February. Pig iron production in the third month was up 7 per cent. The daily average output of steel ingots was the highest since last August and the number of active blast furnaces was the largest since last September. Unfilled orders of the United States Steel Corp. on March 31 totaled 3,995,330 tons, a slight gain over the figure for Feb. 28.

Sharp Gain in Building Awards Is Favorable Sign

One of the most favorable signs to be found in current barometers is the encouraging rise in the volume of building construction. According to the reports of the F. W. Dodge Corp. building awards in March aggregated 37,954,500 square feet compared with 28,338,600 in the preceding month. This gain of 34 per cent is due largely to a spurt in residence construction.

Freight traffic during the week ending March 28 was slightly lower than in the preceding week. While volume fluctuated only slightly in March, the level continued about 19 per cent below the corresponding record of loadings in 1930. The comparatively low rate of freight movement throughout the first quarter is reflected in railroad earnings. The profits for Class I roads in February were lower than in January, which decline is contrary to the usual seasonal trend.

While figures of employment for March are not complete, reports from important industrial sections indicate that a gain of several per cent may be expected. In the case of Ohio a gain of 1 per cent in February was followed by an increase of 2 per cent in March. However, the situation still is spotty in many localities.

Increased Rate of Automobile Production Will Swell April Total

Automobile output has been stepped up again. The two leading builders of low-priced cars increased their schedules sharply last week and advances were noted in the plants of several manufacturers of medium-priced automobiles. However the state of demand has not been fully determined and builders still are proceeding cautiously.

Prices of commodities are lower, but in some respects the situation is more encouraging. Several weeks ago the various price barometers seemed to register a state of stability and Bradstreet's index for April 1 actually showed a gain over the figure for March 1. In the past few weeks, weaknesses in many lines more than offset gains in a number of sensitive commodities, with the result that the weekly indicators again are in a downward trend. STEEL's composite of 14 steel and iron products continues at $31.67, which is barely above the average for March.

Whether or not the present decline in commodity prices generally will extend beyond a brief period is a question of more than usual interest to business. The recent dips to still lower prices in textiles, rubber, cotton, grains

and other commodities are disconcerting to those who believed that rock bottom already had been reached. Nevertheless, the sustained resistance to declines which was so clearly evident during the first three weeks of March is not without significance, and gives weight to the hope that the present period of softness may not continue long.

In general, business now is in a state of flux. In spite of a slight relapse in steelworks operations, the momentum of first-quarter improvements continues strong. Gains in building construction and automobile output, if sustained, should soon contribute greater support to the business structure.

Weekly estimates of steelworks operations continue to check closely with the computed monthly figures of the American Iron and Steel institute. Last month STEEL's weekly estimates for the issues of March 5, 12, 19 and 26 were respectively 55, 55 to 56, 57 and 56 per cent, averaging 55.87 per cent. The institute's monthly figure for March was 54.74 per cent. Thus STEEL's weekly estimates were at variance with the official figure by only 1.13 per cent, a discrepancy which may be easily explained by the fact that the last two days of the month fell in a week which was reported in STEEL in April instead of in March.

Thumb Nail Sketches of Business

Employment in Ohio Gains

For the second consecutive month, figures of industrial employment in the state of Ohio show a gain. According to report of the bureau of business research, Ohio State university, the increase in March over February was 2 per cent. The gain in February was 1 per cent over January. The bureau's report states that the employment increase in March from February was experienced in all types of employment, and amounted to 1 per cent in the non-manufacturing industries, 2 per cent in the non-manufacturing occupations, and 3 per cent in the construction industries. The 1 per cent increase in the manufacturing industries was no greater than the usual seasonal increase, and the 3 per cent increase in the construction industries was substantially less than the usual seasonal increase of 6 per cent, indicating no more than seasonal improvement in the manufacturing industries and a seasonal decline in construction. The 2 per cent increase in non-manufacturing employment, however, was greater than the usual seasonal increase of 1 per cent indicating a more-than-seasonal gain in non-manufacturing employment.

The 1 per cent increase in manufacturing employment in March from February was caused primarily by increases in chemicals, the lumber products, the machinery, the metal products, the stone, clay, and glass products, and the textiles groups. All other major manufacturing groups reported either no change from February or a further decline.

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Distribution of Wealth

In a recent issue of *The Conference Board Bulletin*, published by the National Industrial Conference Board, Inc., 247 Park Ave., New York, appeared estimates of the amount and distribution of wealth in the United States which afford opportunities for enlightening comparisons. According to the report the total estimated wealth of the country in 1928 was $360,062,000,000 and in 1929 it was $361,837,000,000. However, the per capita wealth, which was $3,004 in 1928, declined to $2,977 in 1929.

In the distribution of wealth by states New York leads with $40,708,000,000 in 1929. Pennsylvania is second with $32,757,000,000, Illinois third with $24,356,000,000, Ohio fourth with $21,390,000,000 and California fifth with $17,048,000,000. The next five in order of rank are Massachusetts, New Jersey, Michigan, Iowa and Missouri.

Numerous surprises appear in the estimates of per capita wealth in 1929. Nevada leads with $6,318 per person. Wyoming is second with $5,227, South Dakota third with $4,964, Montana fourth with $4,755 and Iowa fifth with $4,617. In wealth per capita the so-called industrial and commercial states are well down the list. New York's per capita wealth is $3,276, Pennsylvania $3,425, Illinois $3,227, Ohio $3,250 and California $3,093. Mississippi is low with $1,242.

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Believe Price Decline Arrested

As a result of a world-wide study of price trends, the National Industrial Conference board reports that the world decline of prices seems to have been arrested in the early part of 1931. According to the report, this study of conditions in 25 countries during 1930 suggests two general conclusions: First, those countries which had been able to maintain a high level of industrial and trade activity after an acute business depression had set in elsewhere began to feel the effect of an unfavorable international situation toward the end of 1930. Second, there is a general feeling in most countries of the world that by the end of 1930 the worst phases of the business depression had probably been reached, and that, while no immediate and rapid business revival is expected, the business situation in 1931 should slowly but steadily improve.

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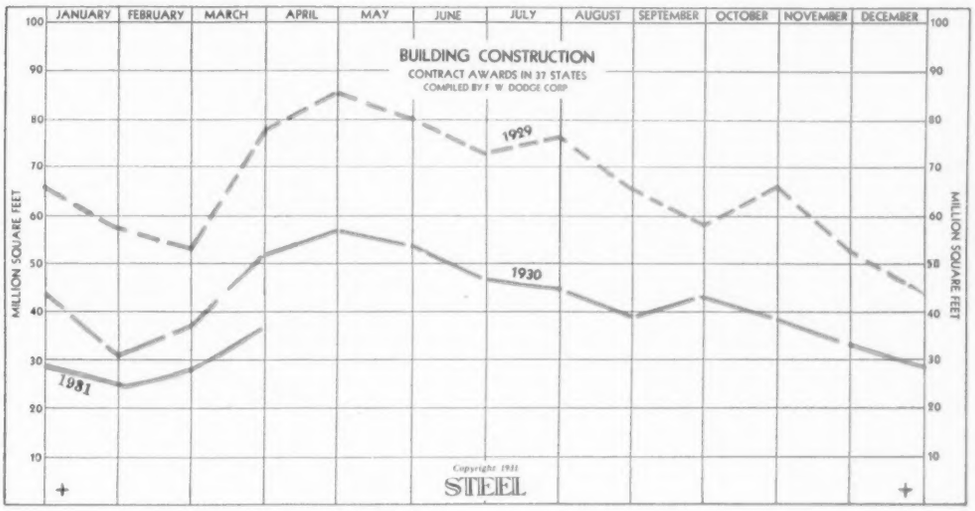
Conditions Brighter in Canada

The current report of the department of commerce gives a somewhat more cheerful view of the outlook for business in Canada: "Improvement in trade continues with growing commercial and industrial activity reported from Montreal, Toronto and Winnipeg, and a more optimistic outlook from Vancouver. Prairie province sales of farm implements still reflect the lower purchasing power of farmers but new automobile sales in this section during the first quarter of the year were slightly above last year's business. Ontario automobile sales are also fair in both new and used cars and wholesale hardware is more active in that section although the heavier turnover is attributed to low retail stocks. An amendment to the Corporations Tax act passed by the Ontario legislature during the week provides for a levy of one-tenth of one per cent on the paid up capital stock of every incorporated company and on all sums of money raised by the corporation, including advances or loans by other companies.



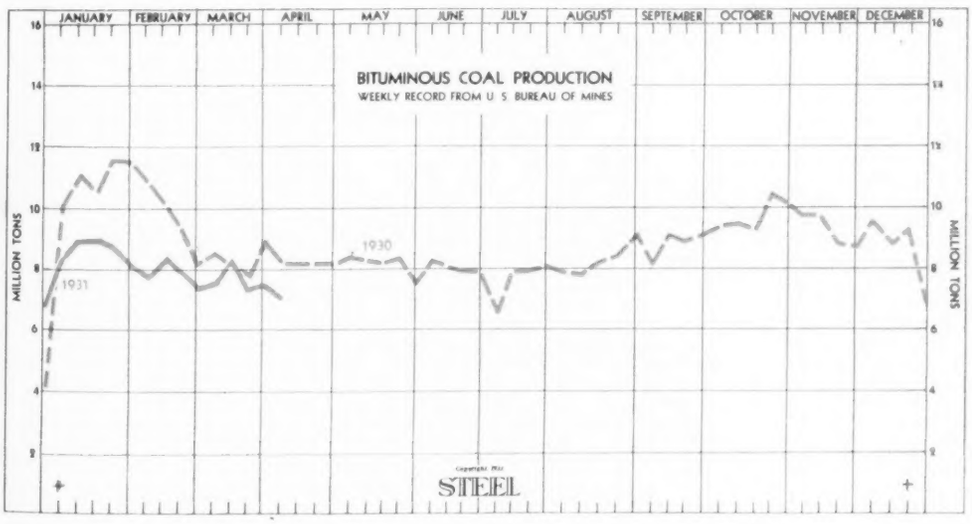
Square Feet	
March, 1931	37,954,500
February, 1931	28,338,600
March, 1930	53,810,000

Building Awards Move Up Sharply with Seasonal Trend

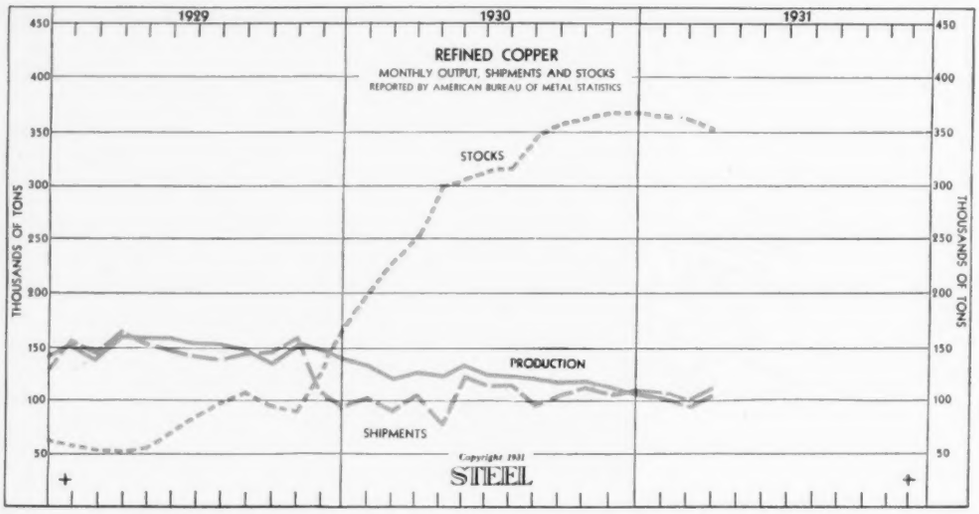
Contract awards for building construction went up with the seasonal expansion of activity during March. A total of 37,954,500 square feet of contracts was awarded, compared with 28,338,600 square feet in February, a gain of 33.9 per cent. The increase is not quite as great as in 1930, when March contracts, at 53,810,000 square feet, were 40.8 per cent above the previous period. However, there is a considerable resumption of residential building, and in March this class involved 22,089,500 square feet, up 33.4 per cent from the 16,559,300 square feet contracted for in February. Contracts for industrial buildings also were greater, up 18.1 per cent to 1,770,300 square feet.

Coal Output Continues to Lag Behind Normal Figures

Total production of soft coal during the week ended April 4 is estimated at 7,214,000 net tons, a decrease of 3.9 per cent from output of 7,509,000 tons in the previous week. The decrease was due to time lost on a holiday, and follows a course similar to that of past years. Daily average production was 1,244,000 tons, compared with 1,621,000 tons per day in the corresponding week of 1930. Only during the week ended March 14 has output of bituminous coal exceeded the like week of last year. Production for the calendar year to April 4 amounts to 108,159,000 tons or 1,352,000 tons per day. Comparable figures for a year ago are 129,817,000 tons and 1,621,000 tons.



Thousands of Tons		
April 4	7,214	8,248
March 28	7,509	8,911
March 21	7,410	7,832
March 14	8,371	8,077
March 7	7,705	8,565
Feb. 28	7,455	8,179



Stocks

	Tons
March, 1931	354,205
February, 1931	363,629
March, 1930	256,020

Production

March, 1931	102,058
February, 1931	99,853
March, 1930	127,064

Shipments

March, 1931	111,482
February, 1931	100,051
March, 1930	104,167

Further Reduction in Copper Stocks Takes Place in March

Refined copper stocks dropped enough during March to make the decline a little more noticeable than the negligible reductions of the past few months. At the end of March they stood at 354,205 tons, down 9424 tons from February. The cut was the best since stocks reached a peak last November at 369,832 tons. March output, up to 102,058 tons from 99,853 tons in February, increased because of the longer month. A year ago production was 127,064 tons. Shipments gained to 111,482 tons and for the third time this year topped the corresponding month of 1930; a month before they were 100,051 tons and a year before, 104,167 tons. Shipments drew upon old orders, as sales were lower.

Iron and Steel Prices Still Subject to Minor Fluctuations

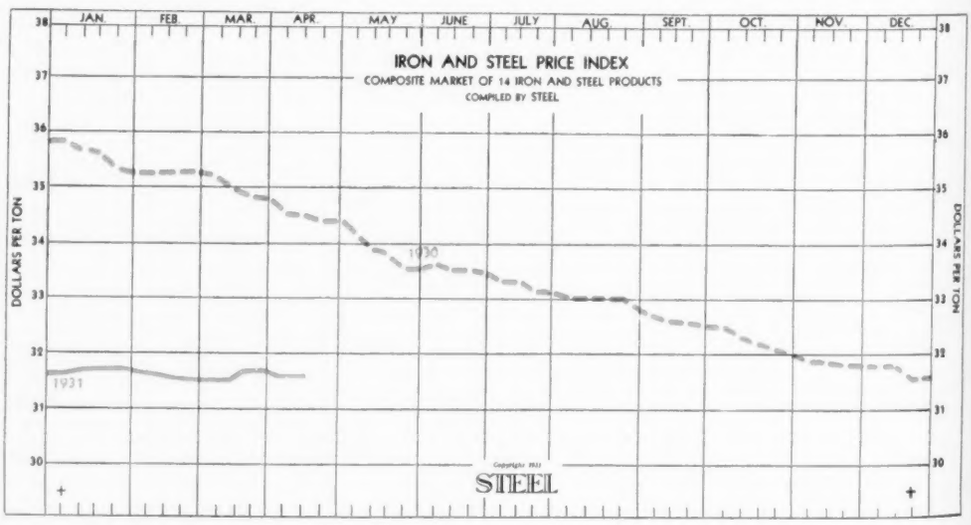
STEEL's composite of iron and steel prices was unchanged at $31.67 on April 8, after declining to that figure on April 1, due to a weakness in the price of sheets. There are indications that additional soft spots in the same commodity will lower the index during the current week. The gain of ten cents made on March 18, when firmness in southern and Mahoning valley pig iron and in wire rods was manifested, was held only to the second week. It is noted that the monthly average for March was $31.66, a gain of a single cent over the average for February, but the first time that a decrease in the monthly average has not been registered since May, 1929 at which time it stood at $37.10.

Weekly Figures

April 8	$31.67
April 1	31.67
March 25	31.71
March 18	31.71
March 11	31.61
March 4	31.61
Feb. 25	31.61

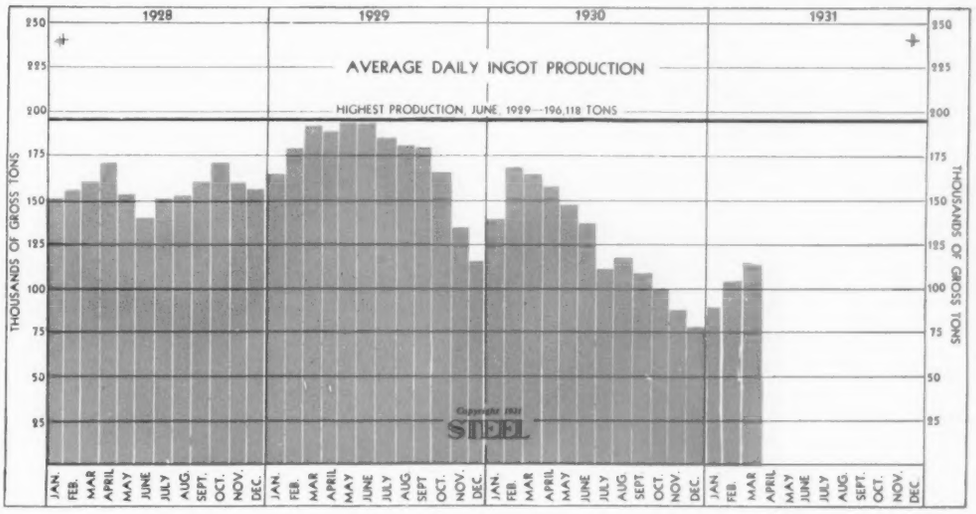
Monthly Averages

March	$31.66
February	31.65
January	31.71
December	31.74



	1931	1930
March	116,120	165,381
Feb.	105,305	169,930
Jan.	91,971	140,596

	1930	1929
Dec.	77,222	116,120
Nov.	89,379	135,116
Oct.	100,756	167,098
Sept.	110,307	181,119
Aug.	119,050	182,491

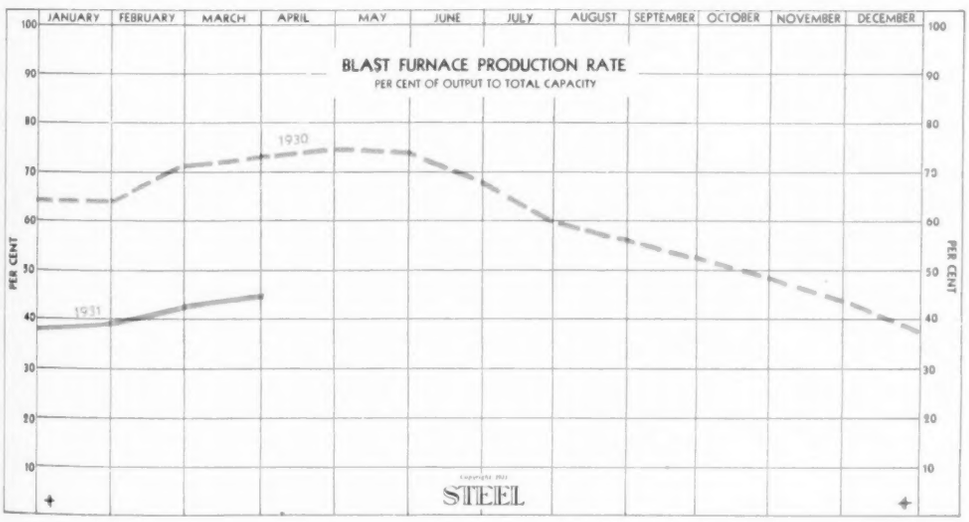


Ingot Output Rises to Best Rate Since Last August

Production of open-hearth and bessemer steel ingots was at the daily rate of 116,286 gross tons in March, compared with 105,305 tons daily in February, representing a gain of 10 per cent. Not since August last year, when the daily average was 119,050 tons, has production been higher. However, a comparison with March, 1930, when the rate was 165,381 tons, still makes the present activity appear in an unfavorable light. The industry passed through March at 54.74 per cent of capacity, the third consecutive gain in operations since the low of 38.57 per cent in December. While output expanded throughout the first quarter, the average daily rate for the period was only 104,337 tons.

Blast Furnace Operations Gain as Seven Stacks Are Added

The rise of 7.1 per cent in the daily rate of pig iron production during March was accompanied by a gain of almost three points in rate of operation, from 42.5 per cent of capacity to 45.4 per cent. Each of the first three months of the year has seen a net gain of seven stacks. Three merchant and five nonmerchant stacks were added in March, and one nonmerchant furnace blown out, bringing the total to 116 of a potential 307. The rise from 38.4 per cent in January to 45.4 per cent in March this year compares with a rise of from 65 per cent to 74.5 per cent in the first quarter of 1930. Operations last month were at the best rate since last October, when they were 49.6 per cent.



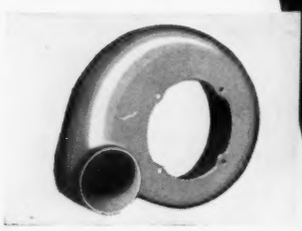
Per Cent

	1931	1930
March	45.4	74.5
Feb.	42.5	72.1
Jan.	38.4	65.0

	1930	1929
Dec.	38.1	65.5
Nov.	44.1	75.8
Oct.	49.6	82.6
Sept.	53.8	83.3

Assembly—Square Pegs and Round Holes . . or *Pressed Steel and Precision* ▼ ▼ ▼ ▼

Which is it in your factory?



This fan housing, when redesigned in Pressed Steel entirely eliminated the cost of machining and refitting. Total production costs were reduced 30%.

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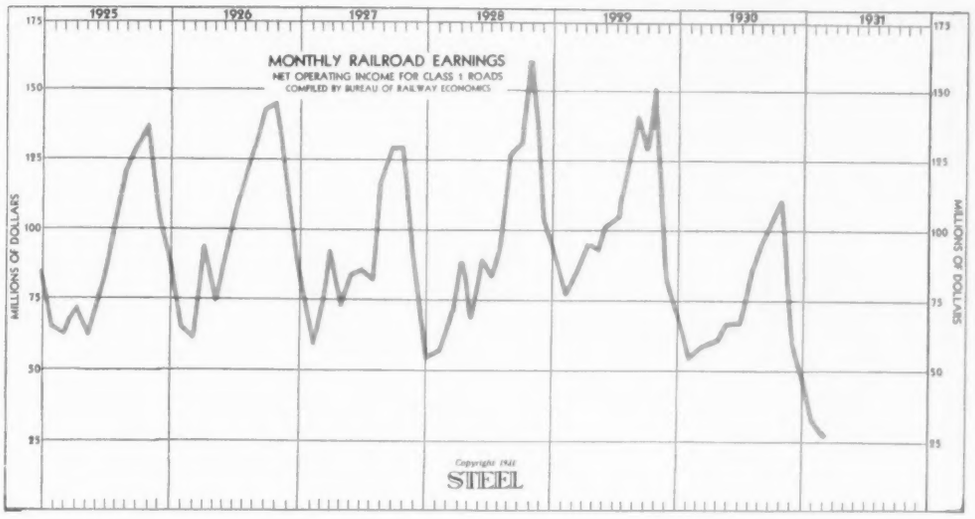


Million Dollars

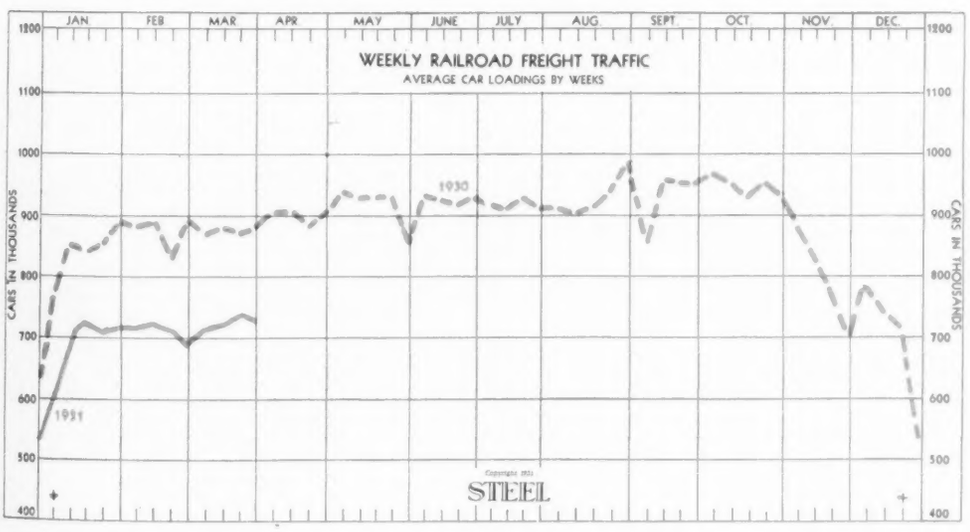
	1931	1930
Feb.	27.2	59.4
Jan.	33.8	55.4
	1930	**1929**
Dec.	49.4	72.2
Nov.	62.1	86.6
Oct.	112.3	152.9

Railroad Earnings Fail to Recover in February

A further decrease in railroad income in February was contrary to the usual seasonal trend, as the normal gain in freight movement generally brings a rise in earnings. Income of $27,264,467 during the period compares with $33,849,116 in January. Last year net operating income gained moderately from $55,454,416 in the first month to $59,452,006 in February. Railroad income has declined in every month since last October. For the first two months of this year net operating income was at the annual rate of return of 1.96 per cent on property investment. This compares with 3.79 per cent in the same period of 1930. Of the 171 Class I railroads, 57 operated at a loss in February.

Loadings of Revenue Freight Register Small Decline

Total freight car loadings for the week ended March 28 were 740,079 cars, down 1863 cars from the previous week. The figure still is the highest, with the exception of the preceding week, of any week this year. For the present calendar year to date loadings are about 19 per cent under the 1930 period and 25 per cent under 1929. Total loadings on March 28 were 9,266,039 cars, compared with 11,269,184 in the corresponding weeks of 1930 and 12,153,528 in 1929. March, with successive gains during the first three weeks and but a slight decline in the fourth, has the best monthly average thus far in 1931, but only by a small margin. Four weeks in March averaged 737,204 cars per week.



	1931	1930
March 28	740,079	885,324
March 21	741,942	875,375
March 14	734,262	881,187
March 7	732,534	873,548
Feb. 28	682,000	899,498

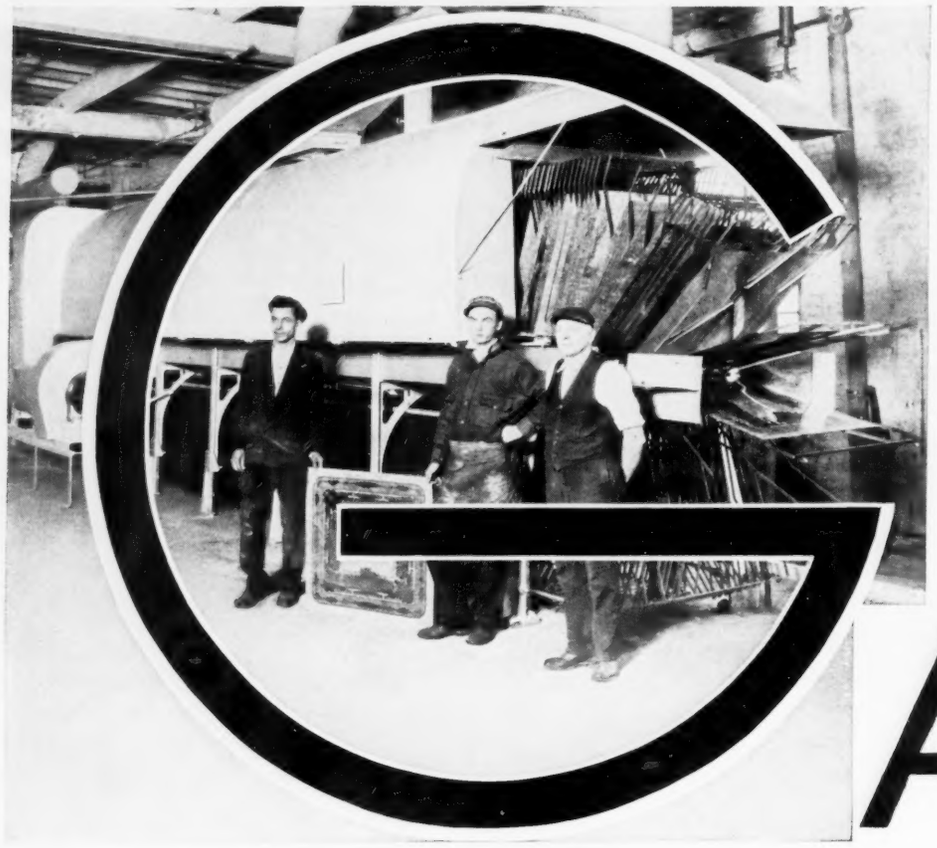


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Fig. 1—Open-hearth practice now calls for the insulation of many furnace parts

Insulating Open-Hearth Furnaces

BY S. M. JENKINS
Armstrong Cork & Insulation Co., Lancaster, Pa.

REGENERATOR walls of open-hearth furnaces, as a rule, are partly under the ground, and the construction of the outside finish, therefore, differs. The wall above ground should be built of 13½ inches of first-quality firebrick and of 4½ inches of high-temperature insulating brick protected with a steel shell, or of 18 inches of first-quality brick wall with 4½ inches of low-temperature insulating brick protected in like manner. Below ground the same firebrick and insulating brick construction should be followed, faced with a steel shell if a steel pan is used; and a concrete wall if the steel casing stops at ground level. This concrete wall should be poured in place before the insulated brick wall is built. If red brick walls are used they should be built independently.

Regenerator arches should be 9 to 12 inches of firebrick and 2½ inches of high-temperature insulating brick over a 9-inch firebrick arch adjoining the fantail arch. Low-temperature insulating brick, 2½ inches thick, should be used over the remainder of the regenerator arch. Where 12 inches of firebrick is used, 2½ inches of low-temperature insulating brick should be laid over the entire regenerator arch. The insulating brick should be laid dry over the firebrick arch sprung from a substantial skewback, after the arch has been brought up to a temperature so that in part, at least, it has reached its ultimate position. These brick then are grouted in place with insulating brick mortar and covered with ½-inch of insulating cement. An insulating brick arch such as this forms a permanent, tight, insulated crust independent of

INSULATING open-hearth furnaces is a comparatively recent development and is commanding the attention of many operators. The grade of insulating brick to use, how it should be installed, cost of insulating furnace equipment and other data are presented in the accompanying article. The author, S. M. Jenkins, is assistant sales manager, in charge of high-temperature insulation, Armstrong Cork & Insulation Co., Lancaster, Pa.

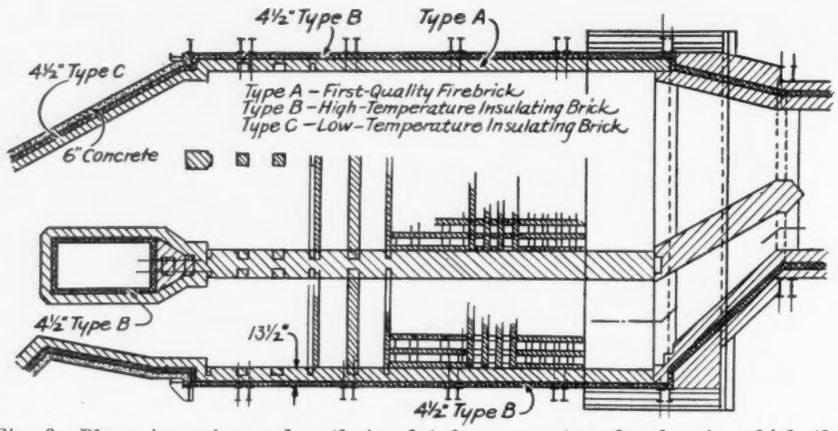


Fig. 2—Plan view of open-hearth insulated regenerator chamber in which the gas and air pockets have a common center wall

any expansion or movement of the firebrick arch which would cause cracks and air infiltration.

The fantail side walls should be built of 13½ inches of silica brick and of 4½ inches of high-temperature insulating brick. The bases should be 13 inches of silica brick insulated with 4½ inches of high-temperature insulating brick all steel encased. The fantail arches should be 12 to 13½ inches of silica brick insulated with 2½ inches of high-temperature insulating brick laid dry with the same skewback arrangement and construction as on regenerator chambers, and finished with ½-inch of insulating cement. It has been found in most cases, that firebrick in the fantails, if insulated and encased in steel, are liable to soften owing to the high temperatures to which these walls are subjected.

Slag pockets should be built of 4½ inches of high-temperature insulating brick in back of 18 inches of silica brick on the side walls which, in turn are encased by a steel shell. The base should be made of 9 inches of firebrick with 4½ to 5 inches of high-temperature insulating brick on top of the concrete foundation. With 2 x 2-inch circulating flues protecting the concrete foundation, this construction is found advisable particularly where the foundations are close to high-temperature gases.

Open-hearth flues should be built with 4½ inches of low-temperature insulating brick on the side walls and over the firebrick arches. The firebrick walls of such flues are generally 9 inches thick which is sufficient for structural strength. Low-temperature insulating brick should be used for this purpose inasmuch as they will stand the temperature and moisture and give the highest efficiency. The bases of flues should include 4½ inches of firebrick and 2½ to 4½ inches of low-temperature insulating brick laid on a concrete foundation.

Regenerator chamber bases should be divided into two classes. One where the regenerator is built in a steel pan and insulated for protection and the other where the regenerator chambers are built on a concrete foundation. In the latter case the bases should be insulated with at least two 2½-inch courses of high-temperature insulating brick faced with 2½ to 9 inches of firebrick. This insulation should cover the entire concrete mat, with the exception of foundation for the outside main regenerator wall supports. The rider walls are built on this insulated base which will withstand sufficient crushing to allow for weight of rider walls and checker weight.

Temperatures Vary

Three-pass regenerator chambers show a higher temperature in the first pass so that where a 13½ or 18-inch firebrick side wall is used the 4½ inches of brick in back of the firebrick should be of the high-temperature insulating grade. The second and third pass side walls should be as previously described. The arch over the entire first pass should be 12 inches of firebrick or silica brick and 2½ inches of high-temperature insulating brick and ½-inch of insulating cement laid as previously described. The base of the first chamber of a 3-pass regenerator should have 5 inches of firebrick and 4½ or 5 inches of high-temperature insulating brick protecting the insulating concrete foundation.

If open hearths are built in swampy soil, piles are driven and the concrete mat is poured covering these piles. The regenerator chamber below the ground generally is built in a steel plan. This pan is protected by heavy insulation. A typical insulation is several inches of gunite, a graphitic steel, and a series of air flues of about 2 x 2 inches spaced 12 or 14 inches apart and covered with 6 inches of insulating concrete over the entire area of the graphitic steel and extending between the flues. The outside walls rest on this mat and the base under the checkers is faced with 7½ inches of high-temperature insulating brick and 4½ inches of firebrick. This carries also under the rider walls. Ample clearance should be left between the side wall of regenerator buckstays and the steel protection pan, as shown in Fig. 4.

Silica brick are recommended for all fantail walls, arches, bases, all slag-pocket work where high-temperature insulating brick are used, and in the regenerator arch over the first of a 3-pass unit. First-quality firebrick are recommended for all other walls, bases, and arches which are insulated in any manner. Second-quality firebrick are not recommended except possibly in the cooler flues because an effort is made in this construction to keep the walls as thin as possible and the heat return as high as the insulating materials will afford.

All insulating brick are selected after temperatures have been checked carefully. Low-temperature insulating brick should not be subjected to a temperature in excess of 1600 degrees Fahr.; their crushing strength is 225 pounds a square inch cold and 215 pounds a square inch at 1600 degrees Fahr. High-temperature insulating brick should not be subjected to a temperature in excess of 2500 degrees

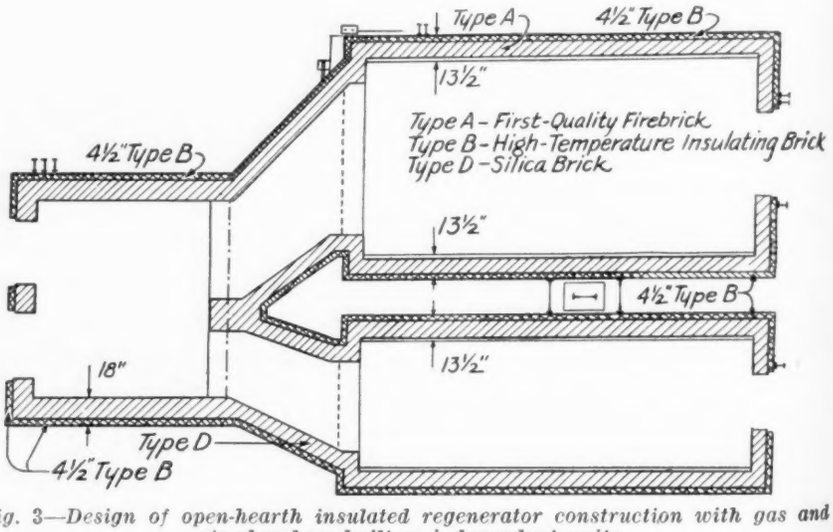


Fig. 3—Design of open-hearth insulated regenerator construction with gas and air chambers built as independent units

Fahr.; their crushing strength is 250 pounds a square inch cold and 80 pounds a square inch at 2332 degrees Fahr. The crushing weights and expansions of refractories also should be checked so that the insulating brick can be selected properly. When the insulating brick is laid against the steel shell throughout the firebrick wall receives the full benefit of the buckstay supports, where the insulating brick are of sufficient strength to withstand any expansion of the firebrick without crushing. This construction prevents the firebrick wall from caving in, buckling or cracking.

Incidental materials other than the insulating brick include insulating concrete and insulating cement. The insulating concrete is recommended where surfaces are rough or uneven and where the use of this material saves labor in leveling the foundation. It also is recommended where crushing weights exceed the safe limits of insulating brick. In all other foundation construction high-temperature insulating brick are recommended because of their light weight and because they are a 24 per cent better insulator than insulating concrete and cost slightly less in place. Insulating cement is used over regenerator arches and is applied after expansion has been taken up. It gives slightly additional insulation and reduces air infiltration.

Labor in placing firebrick is figured at $30 a thousand and includes all general labor, scaffolding, fire clay, carrying and removal of materials. Labor in placing insulating brick is figured at $30 a thousand although the charge for laying the sized low and high-temperature insulating brick is considerably under the laying of fire brick inasmuch as it requires little cutting, no leveling, and being against steel shell or concrete, little skill.

How Mix Is Proportioned

Insulating concrete is a mixture of four parts of calcined diatomaceous earth by volume to one part of portland cement by volume. Water first should be mixed with the calcined earth and after it thoroughly is saturated, the portland cement is added. This mixture should be made stiff and rammed into place to get the required strength. Labor plays an important part in the efficiency of this insulating product and, therefore, the conductivity of such a mass varies in proportion to the care with which the formula for mixing and placing is followed. This mixture should be allowed not less than five to eight days for drying. However, the brickwork can be started after 48 hours. On the weight basis a laboratory analysis shows 30 pounds of calcined earth, 23 pounds portland cement, and 40.7 pounds of water to each cubic foot of material as mixed. Considerable water, therefore, must be driven out of this mass before it becomes thoroughly dry.

One of the difficulties encountered in previous years in using insulating brick for walls subject to high temperatures, was caused by the unequal expansion in the various materials used. This is particularly true where high temperatures are held in the firebrick walls which show more expansion than insulating brick walls. It was found difficult to unite these two walls without causing breakage of bonds but with steel shell construction this trouble has been overcome and repairs made easier. The elimination of red brick on the outside of equipment has eliminated any bond-

Cost of Open-Hearth Insulation and Return on Investment

	Wall Thickness, Inches					Temperature to Which Materials Are Subjected, degrees Fahr.				A	B	C	D	E	F	G	H
No.	First quality brick	High-temp. insulating brick	Low-temp. insulating brick	High-pressure block	Total	High-temp. insul. brick	Low-temp. insul. brick	High-press. block	Outside temp., deg. Fahr.	Wall cost per sq. ft.	Percent of first cost	Annual cost of insulation	Cost of insulated over noninsulated wall	B.t.u. loss per sq. ft.	Heat saved per sq. ft.	Value heat saved annually per sq. ft. at 27½c per million B.t.u.	Net value of heat saved
1.	18	....	....	....	18	....	....	....	498	1.82	....	....	....	775	....	....	....
2.	13½	4½	....	....	18	1633	....	....	333	2.05	334	.0306	0.23	455	320	$7.70	$0.766
3.	13½	4½	2½	....	20½	1890	1108	....	263	2.36	192	.0718	0.54	314	461	1.111	1.039
4.	13½	4½	2½	2½	23	2068	1586	1130	213	2.65	143	.1144	0.83	220	555	1.342	1.228
5.	13½	4½	4½	....	22½	2004	1400	....	220	2.63	145	.1077	0.81	246	529	1.271	1.163
6.	13½	4½	....	4	25	2074	....	1600	205	2.55	171	.1071	0.73	215	560	1.350	1.243
7.	13½	4½	7	....	25	2090	1638	....	183	2.95	107	.1503	1.13	206	569	1.365	1.215
8.	13½	4½	4½	2½	25	2130	1721	963	180	2.95	112	.1503	1.13	186	589	1.420	1.270
9.	13½	4½	9	....	27	2132	1755	....	195	3.22	87	.1862	1.40	202	573	1.388	1.202
10.	13½	....	4½	....	18	....	1803	....	283	1.94	790	.0519	0.12	360	415	1.000	0.949
11.	22½	....	....	....	22½	....	....	....	418	2.27	....	....	....	635	....	....	....
12.	18	4½	....	....	22½	1520	....	....	298	2.50	232	.0306	0.23	400	235	0.565	0.535
13.	18	4½	2½	....	25	1787	1055	....	255	2.82	133	.0732	0.55	298	337	0.805	0.732
14.	18	4½	....	2½	25	1883	....	1294	232	2.83	147	.0745	0.56	256	379	0.906	0.832
15.	18	4½	4½	....	27	1909	1359	....	227	3.08	123	.1077	0.81	243	392	0.940	0.832
16.	18	4½	....	4	26½	1983	....	1513	199	3.00	126	.0971	0.73	210	425	1.020	0.923
17.	18	4½	7	....	29½	2002	1556	....	196	3.40	79	.1503	1.13	202	433	1.040	0.890
18.	18	4½	4½	2½	29½	2058	1668	978	170	3.40	83	.1503	1.13	182	453	1.090	0.940
19.	18	4½	9	....	31½	2077	1700	....	168	3.67	66	.1862	1.40	172	463	1.111	0.925
20.	18	....	4½	....	22½	....	1725	....	265	2.40	560	.0173	0.13	324	311	0.745	0.728
21.	18	2½	4½	....	25	1854	1513	....	235	2.77	164	.0665	0.50	266	369	0.887	0.821
22.	22½	4½	....	....	27	1403	....	....	295	2.95	76	.0904	0.68	383	252	0.606	0.516
23.	22½	....	4½	....	27	....	1589	....	260	2.86	116	.0785	0.59	316	319	0.764	0.686
24.	22½	4½	....	2½	29½	1784	....	1220	227	3.26	80	.1317	0.99	250	385	0.930	0.798
								ARCH									
(a)	9	....	....	....	9	....	....	....	504	0.91	....	....	....	1500	....	....	....
(b)	9	2½	....	....	11½	1590	....	....	365	1.28	471	.0492	0.37	757	743	1.900	1.741
(c)	9	....	2½	....	11½	1765	....	....	331	1.22	675	.0412	0.31	614	886	2.134	2.093
(d)	12	....	....	....	12	....	....	....	463	1.26	....	....	....	1230	....	....	....
(e)	12	2½	....	....	14½	1469	....	....	346	1.63	349	0.492	0.37	675	555	1.337	1.288
(f)	12	....	2½	....	14½	1651	....	....	318	1.58	491	0.426	0.32	561	669	1.611	1.568

Materials	Shrinkage or calcination temperatures, degrees, Fahr.
High-temperature insulating brick	2576
Low-temperature insulating brick	1600
High-pressure block	1000
Insulating concrete	1800

Walls finished with steel shell.
Open-hearth regenerator chambers estimated at 2455 degrees Fahr.

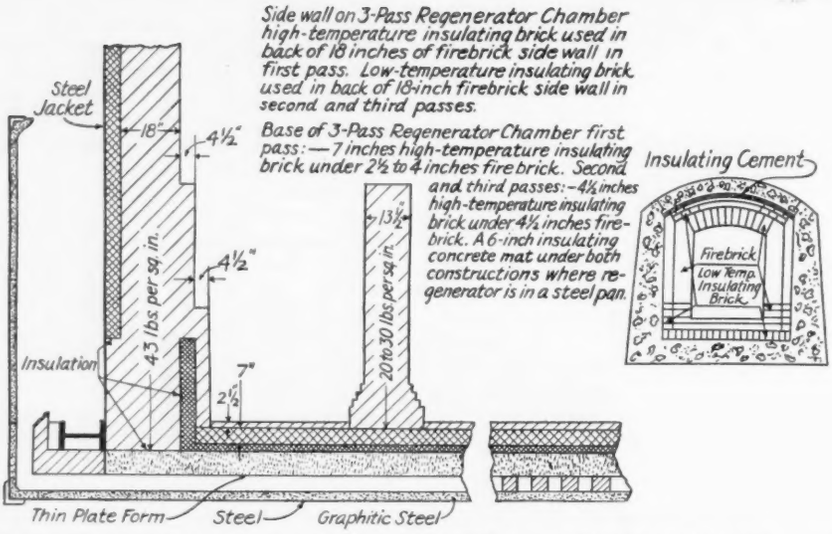

Side wall on 3-Pass Regenerator Chamber high-temperature insulating brick used in back of 18 inches of firebrick side wall in first pass. Low-temperature insulating brick used in back of 18-inch firebrick side wall in second and third passes.
Base of 3-Pass Regenerator Chamber first pass:—7 inches high-temperature insulating brick under 2½ to 4 inches fire brick. Second and third passes:—4½ inches high-temperature insulating brick under 4½ inches fire-brick. A 6-inch insulating concrete mat under both constructions where re-generator is in a steel pan.
Steel Jacket
18"
4½"
4½"
13½"
7"
2½"
43 lbs per sq. in.
20 to 30 lbs per sq. in.
Insulation
Insulating Cement
Firebrick
Low Temp. Insulating Brick
Thin Plate Form
Steel
Graphitic Steel

Fig. 4—Construction recommended for insulating open-hearth regenerator flues when built in moist ground

ing deficiency in this connection.

Since insulating brick are laid at the same time as firebrick and have the same mortar box requirements, there is no additional cost of scaffolding or forms which is chargeable to insulation. Brick of insulating quality are light in weight and are handled in larger quantities, either in bulk or in cartons or wooden crates, than is possible with firebrick, therefore, the general labor of handling is slightly less than handling of the refractory materials.

The life of noninsulated open-hearth equipment has varied considerably. Some furnaces are operating after 25 years. Generally it is found that the changes being made in equipment cause them to be antiquated in much less time. Extensive repairs, amounting almost to rebuilding, take place every few years. It also is found, that air infiltration through old settings is so large that some of the modern changes, such as temperature controls, forced draft, etc., are not practical. Noninsulated settings are invariably heavy walls which require considerable space that otherwise could be used to better advantage in the checker chamber proper.

Infiltration Is Negligible

Insulated regenerator chambers besides showing a reduced heat loss, also show little air infiltration because of the steel shell. The combination of these two aid considerably in reducing the manufacturing cost of steel. With high-temperature insulating materials available, the refractory walls should be made of only sufficient thickness for structural strength. The heat reflected from the insulation thus will aid in the efficiency of the heat return secured from the checkers. This thin regenerator wall also gives larger checker space and though first-quality firebrick are suggested throughout, there is little increase in the total cost. As mentioned previously, silica brick should be used in certain walls along with high-temperature insulation.

This thin refractory regenerator wall insulated with high-temperature insulating brick was determined by extensive tests of heat conductivity through the regenerator wall. Thirty-four thermocouples were installed in a regenerator chamber, some on the inside for checking the gas temperatures and others every 4½ inches through the firebrick up to the face of the insulating brick. In addition to the thermocouple in front of the insulating brick one was installed 2½ inches in the insulating brick and also in back of the 4½-inch insulating brick, or the outside of the wall. This same procedure was followed in the arch bases, end walls, etc. While the temperature varied a few hundred degrees in the regenerator chamber between the reversals, the temperature change in 3 inches from the face of the firebrick was near constant. From 4½ inches back from the firebrick through to the insulating brick, the temperature practically was constant regardless of the reversals. This occurred in all walls above the ground. Therefore, only enough firebrick is recommended for structural strength; any excess would only afford additional heat storage that is not used.

As an example, take wall No. 2 in the accompanying table, composed of 13½ inches of firebrick and 4½ inches of high-temperature insulating brick, showing a temperature of 1633 degrees Fahr. at the face of the insulating brick, and compare this with wall No. 9 composed of 13½ inches of firebrick, 4½ inches of high-temperature insulating brick and 9 inches of low-temperature insulating brick showing a temperature of 2132 degrees Fahr. at the face of the high-temperature insulating brick. Back 4½ inches in the firebrick the temperature of wall No. 2 has receded 240 degrees Fahr. the same distance back in wall No. 9 the temperature has dropped 78 degrees Fahr. Therefore, there is a working difference in the heat return of 162 degrees Fahr., whereas on the outside wall there is shown a temperature difference of 303 degrees Fahr., or in (column F) 243 B.t.u.'s saved in wall No. 9 over wall No. 2. This also applies to regenerative equipment which is not out in the open and subjected to wind conditions. In the base where the heat is held back by the earth, it was found to build up to as high as 850 degrees even though some insulation was used. Insulation slightly heavier than used in the walls above ground and circulating flues to carry off the surplus heat backed up by the ground, therefore, are recommended. One end of the flues should be slightly higher to permit free circulation.

Encasements Are Beneficial

The encasing of regenerator walls in steel and their insulation afford an excellent opportunity for such added improvements as temperature control equipment and the combination with insulation aids in the reduction of fuel consumed. The temperature control protects insulated sections of the furnaces from overheating. Moreover, after a furnace is steel encased and insulated, the fuel must be reduced because of higher efficiencies of preheated air and possibly a shorter working flame which indicates better combustion and less dust carried over into the checkers.

The salvage of first-quality firebrick used in side walls and arches of regenerators for the inside facing material is low. The firebrick not exposed to the fluxing action of the gases can be salvaged if cleaned of clay. Insulating brick placed over the arches and the insulating brick placed against the steel shell and under firebrick paving are salvaged easily, since the bonding clays or mortars are readily removed. Insulating concrete cannot be salvaged or repaired. Insulating block show a low salvage value.

The total cost of firebrick and insulating brick of various thicknesses of walls is shown in column A of the accompanying table. Some of these wall constructions are not practical, because, as is shown in column B, some walls are overinsulated and this increases cost of refractories which in turn reduces still further the savings. Some of the wall constructions also are difficult from the practical construction end but are cited for comparison.

Column C, shows the annual cost of insulation per square foot. This is figured on a ten-year life, that is, the first cost is depreciated 10 per cent annually and 6 per cent interest is

(*Concluded on Page* 48)

Centrifugal Process Meets Needs of Job Galvanizer

BY K. P. ROLSTON
Acme Engineering Co., Pittsburgh

Part II

COATING problems, without opportunity for making test runs, frequently face the job galvanizer. In the accompanying article, the second of a series of three, many operating phases of the centrifugal process of galvanizing are submitted. The first installment appeared in the April 2 issue of STEEL. The concluding installment, to be presented in an early issue of STEEL, will discuss precautionary measures for minimizing the formation of dross.

CENTRIFUGAL galvanizing offers a refined method of coat control. By regulating the temperature of the zinc bath and the speed of centrifuging, the coating can be varied in thickness to meet specifications. This is impossible by any other mode of hot-dip galvanizing.

In jobbing plants where there is a variety of centrifugal galvanizing work, it is customary first to put through the kettle the objects requiring the highest temperature, and then follow with the other articles in rotation depending on temperature requirements. This practice is accepted as the best in small plants that have limited kettle capacity and suffer a marked reduction in temperature as the work proceeds. By adopting such a routine, each article receives treatment in the zinc bath at the temperature best suited to the work.

Size Is Important

Where centrifugal requirements involve a continuous run of the same class of material, a kettle of sufficient size should be provided to maintain the temperature within a few degrees of the correct heat while handling maximum tonnage. There are limitations to kettle dimensions. Overweight of metal will cause the sides to bulge and thus destroy the exterior insulating material. Kettles from 12 feet to about 35 feet long are recommended for use with the centrifugal process. The width and depth depend on individual requirements.

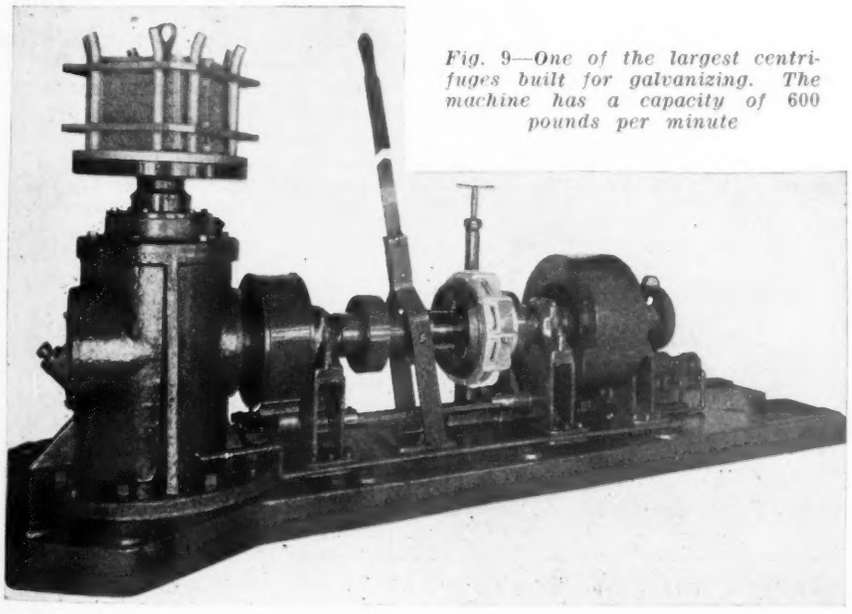


Fig. 9—One of the largest centrifuges built for galvanizing. The machine has a capacity of 600 pounds per minute

Manufacturing galvanizers do not meet the same variety of problems which confront the jobber. The former confines his galvanizing operations to his own line of production and in so doing can build up a definite program. The job galvanizer must be able to handle all kinds of work on short notice, and in many cases must solve problems in coating without an opportunity to make test runs. The centrifugal process responds to all these conditions, and is performing excellent work in both manufacturing and jobbing plants.

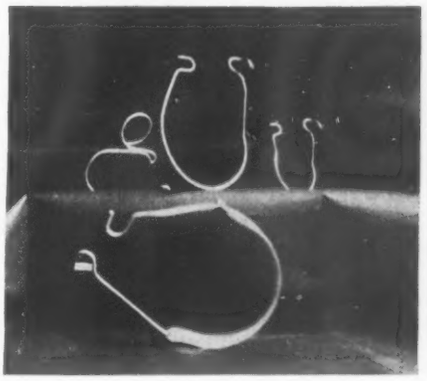


Fig. 10—Centrifugal galvanized cable rings which require smooth satin finish

On any class of work this process saves zinc and reduces rejections. It also materially lengthens the life of the kettle, because centrifugally galvanized articles are treated at considerably lower temperatures than tumbled objects. The lower temperature lessens dross accummulation and the erosion of kettle walls. The reduction in dross formation frequently amounts to nearly 50 per cent.

How Finish Is Controlled

As previously mentioned, the control of finish is secured through the variation in temperature of the zinc bath and the speed of centrifuging. In galvanizing bolts, nuts, or other threaded work, where an accurate fit is essential, it is customary to keep the temperature of the kettle about 870 degrees Fahr. and the speed of the centrifugal machine about 900 revolutions per minute. With these two factors so adjusted the extraction of excess zinc is complete. The coating is of a uniform thickness and fit is assured. The finish of articles so treated is satiny in appearance, without shine, and capable of passing the most severe corrosion tests required by public utilties companies.

To secure a bright finish and a slightly heavier coat the speed of centrifuging should be reduced to

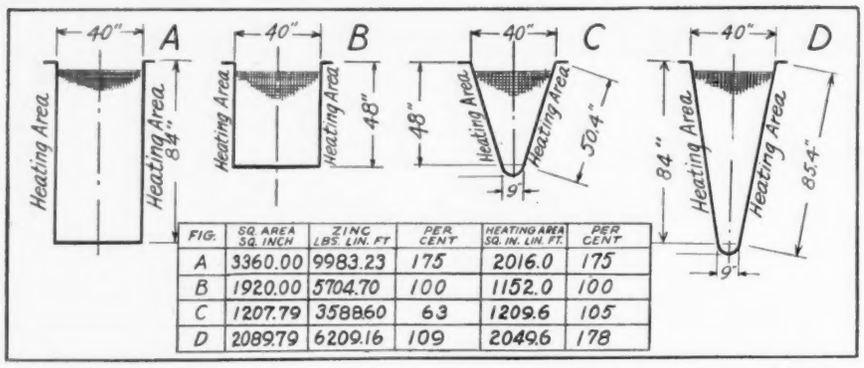


FIG.	SQ. AREA SQ. INCH	ZINC LBS. LIN. FT.	PER CENT	HEATING AREA SQ. IN. LIN. FT.	PER CENT
A	3360.00	9983.23	175	2016.0	175
B	1920.00	5704.70	100	1152.0	100
C	1207.79	358860	63	1209.6	105
D	2089.79	6209.16	109	2049.6	178

Fig. 11—Area and heating surface of flat bottom and V-shaped zinc kettles

about 500 revolutions per minute, with approximately the same kettle temperature. For the regular jobbing shop, 500 revolutions per minute is recommended, because it has a wide range of coverage in handling all types of malleable iron castings, and steel work, and will produce excellent finishes on a variety of material, without the use of a variable-speed motor drive. On blank pipe fittings, where an exceptionally bright finish is desirable, which can be obtained only at the expense of a heavier coating of zinc, it is recommended that the speed of centrifuging be reduced to about 250 revolutions per minute, and the temperature of the metal dropped to about 840 degrees Fahr. If the centrifugal machine be called upon to do extracting operations on a wide variety of work, the use of a variable-speed motor is recommended.

Basket Diameter Varies

The diameter of the baskets plays an important part in securing a proper finish and cleanliness of work produced. The peripheral speed of the basket increased with its diameter, and the use of different diameters of baskets will give a wide range of speeds in feet per minute on the circumference of the container, without resorting to a variable-speed driving motor. It is impossible, in this article, to give positively definite data covering individual objects to be galvanized, because successful extracting and coating depend on plant equipment and the type of work being handled. To secure and follow expert advice in the use of centrifugal galvanizing will prove to be the best method of meeting specific problems.

Opinions regarding the temperatures for galvanizing various articles differ considerably, and no hard and fast rules can be made to govern this phase of the work. Two methods are employed in the hot-dip process. One is to carry the maximum temperature suitable for a certain class of article and pass the objects through the kettle rapidly. The other method is to carry the minimum temperature in the kettle and allow the articles to "cook" for 10 or 15 minutes. The former method is practiced where small kettles are used, and the latter where extremely long kettles are employed. Each method has certain advantages, but experience strongly favors the maximum temperature kettle, because of production and high quality afforded.

Long kettles should be provided with more than one thermocouple. The temperature variation from end to end on a long kettle is more noticeable than on the shorter type, and the charging end, when in active production, must have facilities to compensate for heat losses due to absorption by the work. The delivery end of the kettle will show a more uniform reading of temperature, because this end is required only to maintain temperature, and does not have contact with cold work.

Thermocouples, at all times, should be suspended properly above the dross line for the sake of accuracy On shallow kettles care must be exercised to prevent the dross from sweeping in large quantity toward the delivery end, due to the passage of baskets through the metal in this direction. This movement often causes the dross to collect around a couple and affect the reading of the pyrometer.

Short kettles are used more extensively, possibly because of their cheapness, both as to first cost and replacement. They involve considerably less investment in metal and are preferable for the job plant doing a variety of work, which does not amount to a large daily tonnage.

Temperature Is Important

Irrespective of the size of kettle used, the heating problem is one that should be given exacting attention. The temperature fluctuation is more acute with small kettles than with those of the larger type. This is a constant menace to good galvanizing, and can be avoided to a considerable degree if heating provisions are made at the time of installation. A galvanizing installation with too much heating capacity is preferable to one having too little.

To facilitate the heating of a galvanizing kettle, the maximum heating area should be present. This is a feature of kettle design and is a paramount fundamental of successful and economical operation. In manufacturing plants where the daily tonnage demands are excessive this detail should not be overlooked. The conventional flat bottomed kettle,

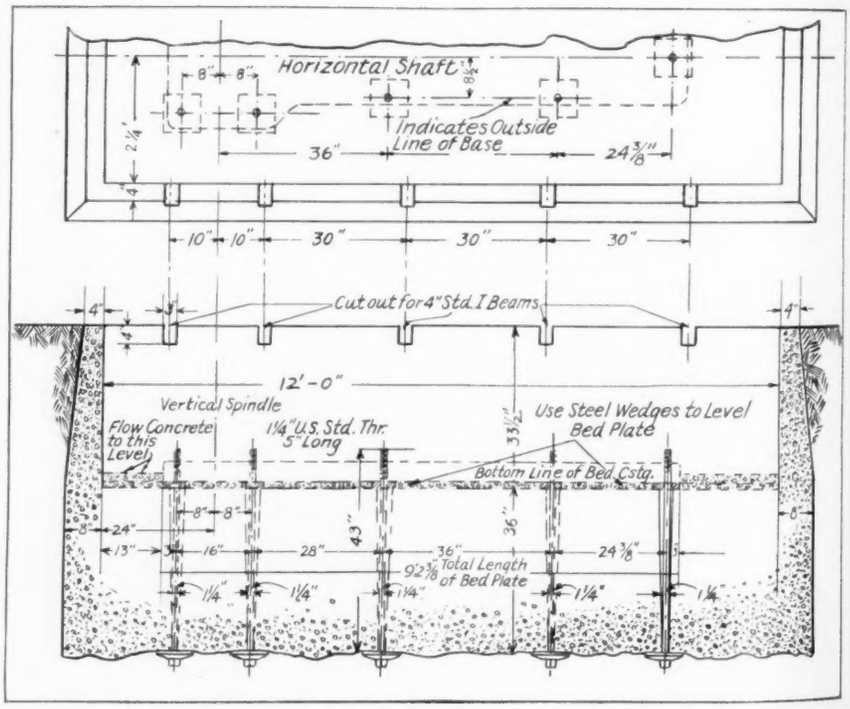


Fig. 12—Details of foundation for full pit mounting of 50-pound centrifugal galvanizing machine

with the foundation built close to the bottom, and the sides of the kettle alone representing the heating surface, is not efficient. If this type kettle is deepened to obtain more side wall heating area, then the cubical contents are increased to such an extent that the metal requirements are excessive in proportion to the production.

For centrifugal and many other kinds of galvanizing, it is advisable to construct kettles with sloping sides and a round bottom with a cross section similar to the letter V. The immediate base of this type kettle can be supported properly on a foundation and the side walls can be braced, if the kettle is of a sufficient height to require such bracing. Using this construction, the conventional depth 3 or 4 feet can be increased to 6 or 7 feet, thus greatly increasing the heating area. This bears an important relation to production. A kettle of this design does not have the metal content of a square bottomed kettle of the same depth, and the zinc required thereby is reduced to the smallest quantity proportionate to heated area.

Coke-fired kettles are dependent on the skill of the fireman. Being manually operated there is no automatic control. Good judgement and experience of the attendant in charge are important. Modern plants demand less guesswork in the matter of daily routine, and hence the rapid replacement of coke-fired kettles by other modern automatic or semiautomatic firing devices.

Kinds of Fuels Used

Natural and artificial gas are used successfully in kettle firing. Natural gas usually is cheaper than artificial but is available only in certain parts of the United States. It has almost twice the B.t.u. value and therefore requires less burner capacity for the same effective temperature. The burner construction, however, is similar for use with either natural or artificial gas and many efficient types of burner equipments are to be found on the market today. Burners, either automatically or manually controlled, are included as standard equipment.

Fuel oil is another means of supplying heat to the kettle, but the equipment is more cumbersome than gas, because of the storage tanks and pressure mechanism required to handle the reserve supply, and propel it to the point of combustion. In some sections of the country it ranks close to gas in the matter of cost.

Disregarding operating costs, electricity is, without question, the best method of heating a kettle from the operating standpoint, because of the ease with which the heating elements can be distributed and controlled, and the lack of necessity for an air supply or draft stack to secure proper combustion, as in the case of coke, gas or oil. An electrically-heated kettle can be insulated to a high degree because no openings are necessary to release the products of combustion.

At present, the cost of electricity is too high to be considered by any but those advantageously near an economical source of supply, but the day is not far distant when this form of kettle heating will become popular. Electricity produces a uniform heat and hot spots on the kettle wall are avoided. The present design of heating elements requires periodical renewals.

Conserves Heat

Efficient insulation is a prime necessity in zinc kettle construction. Heat losses of any kind represent needless expense both in the matter of fuel consumption, and the consequent inconvenience to the workmen creates a loss in production. Modern insulating materials make the remedy a rather simple matter. Insulating brick, cake or powder are available for the kettle builder, and should be used generously for best results. Comfort in the galvanizing room by the scientific application of insulation tends to stimulate production. This especially is true in warm weather when working conditions are at their worst.

Fig. 13—Iron and steel articles representative of those coated centrifugally by job galvanizers

Before building foundations for either kettle or machine equipment a thorough study of the soil upon which foundation is to be constructed should be made. The following list of bearing pressures may be considered good practice in figuring foundation loads:

Material	Tons per square inch
Rock, hardest, in thick layers on native bed	200
Rock, hard, equal to best ashlar masonry	25-30
Rock, hard, equal to best brick masonry	15-20
Rock, soft, equal to poor brick masonry	5-10
Clay on thick beds, always dry	4-6
Clay on thick beds, moderately dry	2-4
Clay, soft	1-2
Gravel and coarse sand, well cemented	8-10
Sand, compact, well cemented	4-6
Sand, clean, dry	2-4
Quick sand, alluvial soils, etc.	0.5-1

If there be any question about the bearing qualities of a certain soil, it is best to determine its load carrying ability by direct experiment, but good judgement, in conjunction with this table, aided by a careful examination of the soil, particularly in compactness and amount of water contained, will enable its probable supporting power to be determined with reasonable accuracy.

In the erection of foundations, the care exercised in their construction should be increased in direct proportion to the size of the foundation and its load-carrying requirments. On small kettles the foundation problem is not difficult. This also applies in a measure to foundations for small centrifugal equipment. On large installations, the foundation question becomes one of great significance. Foundation failure easily can wreck the superstructure, and this has been the case where the erection of the substructure has been left to the judgement of incompetent workmen.

A considerable factor of safety should be allowed to insure successful results. Kettle foundations should be constructed to outlive many kettles. Machine foundations frequently are built to the specifications of the machine manufacturer; but information regarding the type of soil on which the machine is to be erected should be furnished the machine builder to permit his making accurate recommendations.

The center of pressure on foundations should pass through the center of the footing. In the case of large kettle foundations this is a matter of importance. An uneven setting may throw the kettle out of plumb with disastrous results.

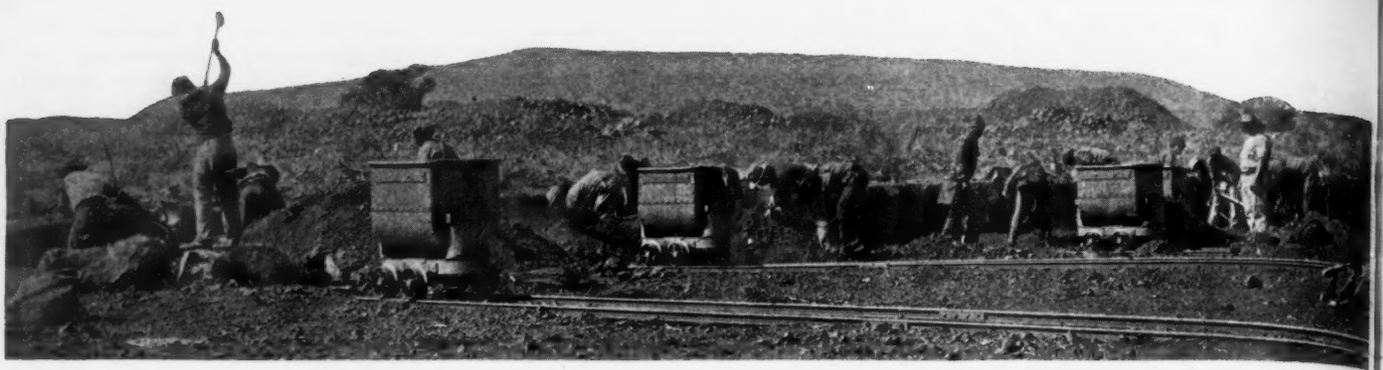
May Rupture Foundation

Kettles 20 to 35 feet long may have a tendency to cause the foundation to settle unevenly from one end to the other, which in turn will cause the top surface of the kettle to have a waved effect, unless the foundation is of ample cross section. This places an undue strain on seams or joints, and is at best unsightly. A ruptured foundation must be replaced in the event of installing a new kettle, and for this reason a vessel of large proportions, with proper reinforcements should be constructed at the time of first installation.

Machine foundations offer less difficulty, inasmuch as they usually are compact instead of long and narrow, as in the case of long kettle foundations. The chief aim in building supports for centrifugal machines is to prevent vibration when carrying maximum basket loads.

Small zinc kettles and machines often have been mounted on upper floors of buildings where the construction would permit. More small kettles perhaps are in service than long units, but with the trend toward mass production, the long kettle and the large centrifuge are awaiting adoption by galvanizers.

(To Be Concluded)



A considerable amount of manganese ore can be obtained by merely picking it up, or by breaking

Manganese Ore in Africa To Be Mined on Large Scale

BY VINCENT DELPORT
European Manager, STEEL

COUNTLESS millions of tons of ore have been smelted since metals have been produced commercially, and the question sometimes arises as to when certain supplies will become depleted. There are in various parts of the world numerous reserves, as yet undeveloped, which will supply all requirements for hundreds of years. Vast deposits exist in South Africa, which have not been mined because of their distance from the coast and from inhabited centers. As civilization is gradually increasing its hold over the world difficulties of mining and shipping are gradually being overcome. Such is the case with regard to reserves of manganese ore which exist in the Postmasburg district of South Africa, west of Kimberly.

The existence of ferruginous ores in that part of the world was discovered by David Livingstone when exploring in South Africa in 1857-1874. Their commercial possibilities appear to have been recognized for the first time in 1922 by Capt. T. L. H. Shone, while prospecting on a farm. Subsequent work demonstrated that the deposits persist over many miles of country as rich ores, available in quantities large enough to supply an important manganese industry. A company called the Union Manganese Mines & Minerals (S. A.) Ltd., with a small capital, was formed to acquire the properties and see what could be done with them. It offered these properties all over the world, and a great deal of interest was aroused, but the deposits seemed too far away for anyone to take them up, until the British Swiss International Corp. Ltd. investigated them. The main difficulty lies in the fact that the deposits are about 67 miles from the nearest railroad, and to build a connecting railroad was the problem of the development of the mine.

A curious law in South Africa provides that only the government can own and operate railroads over two miles in length. Therefore, the government had to be approached by the British Swiss International Corp. to see on what terms the government would consent to build the railroad. The government already was committed up to a large sum, and its program for building railroads is always about five or six years ahead. The corporation proposed to lend the money necessary to build the railroad if the government would start the work at once, and the offer was accepted. The railroad is now in operation.

The British Swiss International then formed the Manganese Corp. (1929) Ltd. to work the deposits. The manganese lies in the northern portion of the Cape province and extends almost without a break from a point about five miles west-northwest of Postmasburg in a northerly direction, about 47 miles in a direct line. The nearest railhead is Koopmans fontein, which is about 67 miles southeast of Postmasburg. This railhead forms the terminus of a branch line, which joins the Kimberley-Capetown main line at Belmont.

It is claimed that the deposit has the highest grade of metallic manganese to be found in the world, the average grade being about 52 per cent manganese in the form of manganese dioxide and manganese oxide. It is roughly estimated that the reserves of ore amount to over 1,000,000,000 tons and they present the striking feature that they can be mined by open-pit methods. The deposits have been opened up in a number of places by means of shafts and trenches, and these workings have shown that the deposit is practically continuous over the whole length. Considerable quantities of ore can be obtained by merely picking up on the surface. This rubble is rich in manganese and is scattered practically over the whole field. Nearly all the ore is very hard and cannot be scratched by a knife; or, if so,

This stack of manganese ore, collected by native workers contains approximately 4000 tons

up the surface. The ore when collected is stocked up in piles containing from 2000 to 5000 tons each

only with the greatest difficulty. There are almost no fines, so that there is no appreciable waste in reducing the ore to small lumps. Furthermore, little loss is experienced during transportation. The specific gravity of the ore averages 4.56. Except in one particular case it has been found to be nonmagnetic. About 90 per cent of the ore is of the compact type, with almost no moisture.

The chemical and physical characteristics of the ore were investigated by Dr. A. L. Hall, assistant director of geological survey, Union Government of South Africa; Dr. Max Richter, professor of geology of Bonn university, and Dr. T. Nel, geologist, Union Government of South Africa.

Although the railroad is not yet completed the Manganese corporation has commenced to work the deposit at the southern point, stocking up considerable tonnage which was scattered over the ground, and boring shafts and trenches in preparation for further operations. Black labor is employed, and modern mining equipment is being installed. By the time the railroad is completed it is estimated that 100,000 tons will be stocked and ready for shipment. To ship easily at the port of Durban the company is building a loading plant, which is being installed. By the time the railroad is completed it is estimated that 100,000 tons will be stocked and ready for shipment. To ship easily at the port of Durban the company is building a loading plant, which is being erected by the Wellman Smith Owen Engineering Corp. Ltd., London, and by the Robins Co. of America. The government considers the industry an asset of considerable value to the country and has offered the company specially low railroad freight rates. It is estimated that the ore will reach port at an actual cost f.o.b. of about £1 ($4.85) per ton, including mining costs, transportation and loading. Ocean freights are favorable, being lower than they are from India, and, as far as the United States is concerned, lower than the freights from Russia.

The company contemplates producing 400,000 tons of 52 per cent manganese ore in the first complete year, April, 1930, to April, 1931. Then it is intended to raise the output to 500,000 tons for the following year, and future activities will depend on conditions of the markets. A considerable tonnage of ore has been sold in advance for the first year of operation, including 100,000 tons to France, 20,000 tons to Germany, and also a tonnage to Belgium and Great Britain. There is at present about 100,000 tons left over from the first year's production, which will be available for the United States, where the company has appointed W. H. Muller & Co., New York, agents.

The policy of the company for the first year has been to try to market the ore by spreading the sales over many countries, so that wide opportunities for trying the ore are taken advantage of. The Manganese Corp. (1929) Ltd. is a private company, with an authorized capital of £1,000,000 ($4,850,000), of which £400,000 ($1,940,000) is fully paid cash, and in addition about £302,000 have been loaned to the South African government for the building of the railroad. It is not intended to put any stock on the market until the company is normally producing and making a profit. An interesting point with regard to the Postmasburg deposits is that there is a considerable tonnage of overburden which is composed of almost pure hematite. This was discovered early in 1924 when the deposits were examined by R. W. Erwin, of the American Institute of Mining Engineers. In a report presented by him it is stated that the hematite will produce a high grade bessemer and manganiferous pig iron. Several samples selected from the various properties showed an analysis of 63.42 per cent to 67.27 per cent metallic iron with 0.75 to 1.15 manganese, 0.55 to 3.31 silica, 0.35 to 2.31 alumina, 0.005 to 0.270 phosphorus, and 0.002 to 0.006 sulphur. With proper selection of the ore three grades of pig iron can be made: Low-phosphorus, which it is claimed is equal to the Swedish pig iron; bessemer pig iron with a phosphorus content of 0.080

Some of the deposits are reached by narrow cuts through the surface

per cent or under, and high-manganese pig iron containing 3 to 5 per cent manganese.

It has been found that the ore is hard enough to stand transportation. It will not pack in the blast furnace stack, and has little tendency to make fines. It is estimated that the cost of mining should not exceed 3 to 4 shillings per ton. The whole of this hematite ore can be mined by open-pit methods, and the thickness of the hematite deposit sometimes reaches 100 meters. It is estimated that hematite worth mining probably amounts to 1,000,000,000 tons.

The Manganese corporation has arranged to strip this overburden of hematite, and proposes to start shipping this ore in 1932, so that total shipments of manganese ore and hematite at the end of 1932 should be about 1,000,000 tons.

What the Ore Contains

Complete analysis of a sample of South African manganese ore

	Percentage
Peroxide of manganese	51.15
Protoxide of manganese	25.71
Peroxide of iron	10.76
Alumina	1.46
Silica	5.11
Baryta	1.57
Lime	0.40
Magnesia	Nil
Phosphoric acid	0.236
Sulphur	0.045
Nickel	Trace
Cobalt	0.080
Arsenic	Trace
Zinc	Trace
Lead	Trace
Copper	0.024
Alkalies	1.58
Combined water	1.56
	99.685
Manganese	52.30
Iron	7.53
Phosphorus	0.103

Even the walls of Lace's cut, Doornfontein, are of manganese ore

A typical outcrop of manganese ore in South Africa

Special Lights Developed for Windowless Plant

A new type of artificial light, developed especially for the windowless plant of the Simonds Steel Industries, Fitchburg, Mass., has been announced by the Austin Co., Cleveland, designer and builder of what is said to be the first controlled-conditions plant to be erected by any industry.

More than 700 fixtures will be needed in the plant, and they are now being made in the Hoboken, N. J., plants of the General Electric Co. A single unit consists of an oxidized aluminum reflector, 12 inches by 26 inches, of a shallow pan shape, with the illuminating units scientifically mounted in the reflector. The unit as a whole operates on a 110-volt alternating current. Some of the tubes will be quartz glass. The units will be attached to the welded steel trusses overhead, and provide a lighting intensity of 26 to 27 foot candles on the working plane.

The result of the unit in operation is said to be a perfect blending of the incandescent and vapor types of light, so that natural daylight is simulated. To further insure the proper effect, engineers have developed a special interior color scheme whereby walls, ceiling, floor, trusses and machinery will be of special colors to harmonize the effects, and make for maximum comfort and working efficiency of employes.

European Representatives To Attend Fuel Conference

Important delegations of fuel technologists from the principal European countries will attend the third International Conference on Bituminous Coal at Carnegie Institute of Technology, Pittsburgh, Nov. 16-21, according to Dr. Thomas S. Baker, president of the institute and organizer of the congresses. Conferences with scientists in the coal centers of Europe during a two month visit assured Dr. Baker of the interest and co-operation of technologists there.

Elevator Guide Rails Are Milled at Rapid Rate

PRODUCTION of elevator guide rails has risen rapidly in recent years to a point where mass production methods are necessary to meet the demand. This has introduced some interesting problems, one of which is the machining of the ends of the rails.

When erected, guide rails are joined by means of a tongue and groove on the ends and fastened by fishplates at the ends of the flanges. Modern high-speed elevators require exact joints at these points to eliminate noise and shock, thus the ends of the rails must be milled to close limits as shown in Fig. 1.

This milling is a simple enough problem in itself—the difficulty lies in the fact that the rails are 16 feet long. The usual method of milling one end at a time involved an expensive handling operation and interfered seriously with the flow of production. The logical solution, of course, was to mill the two ends simultaneously, and although many obstacles remained to be overcome, the operation is performed successfully on the equipment shown in Fig. 2.

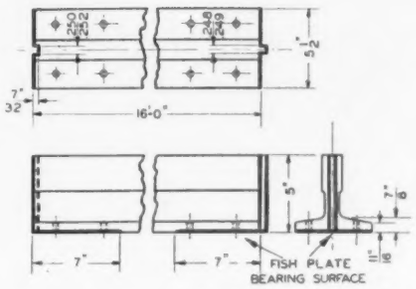


Fig. 1—Sketch of elevator guide rails, heavy lines indicating milled surfaces

Millers Operate in Unison

Two independent hydraulic automatic millers built by the Cincinnati Milling Machine Co., Cincinnati, are arranged to operate together by means of centralized control. The apparatus between the machines is a roller conveyor or guide, used in loading and unloading the work. Each machine has its own fixture mounted on the table. The rails are brought on conveyors to the back of the rear machine and rolled in endwise from that point by a laborer. They pass through the fixture on the rear machine and are carried by the roller guide into the front fixture, against a fixed stop.

The operator stands beside the forward machine and when the rail is in position, he throws an air valve which lowers the conveyor between the machines and drops the work in position on the support blocks in the fixture. The air cylinders which raise and lower the conveyor may be seen between the machine beds. Fig. 3 is a close-up view of the rear machine. As shown, the rail is clamped in place and the rollers of the conveyor are lowered clear, the machine being ready to start the machining cycle.

Contrary to usual practice, the machine tables have no movement, instead they are fastened securely in position, the movement being provided by the cutters themselves feeding past the work. The machine cycle is started automatically by an air valve after the work has been clamped in the fixtures and, to insure saftey, the cycle cannot be started before the work is secure.

Starting from the position shown in Fig. 3, the horizontal cutter comes into action first, milling down across the end of the rail where it comes to a complete stop. The vertical cutter then mills across the rail, finishing the fishplate bearing, and then returns at once at rapid traverse. The horizontal carrier returns at rapid traverse to its starting position and the cycle is complete. All movements are entirely automatic and the two machines go through the cycle simultaneously.

It was mentioned before that when the rail is being loaded, it is located endwise against a fixed stop in the forward fixture. As the machine goes through its cycle, this stop is automatically set aside so that when the rail is unloaded the operator can push it straight on through the machine upon a conveyor while the laborer is inserting a new piece from the rear. Production of the size pieces shown in Fig. 1 is at the rate of about 17 per hour.

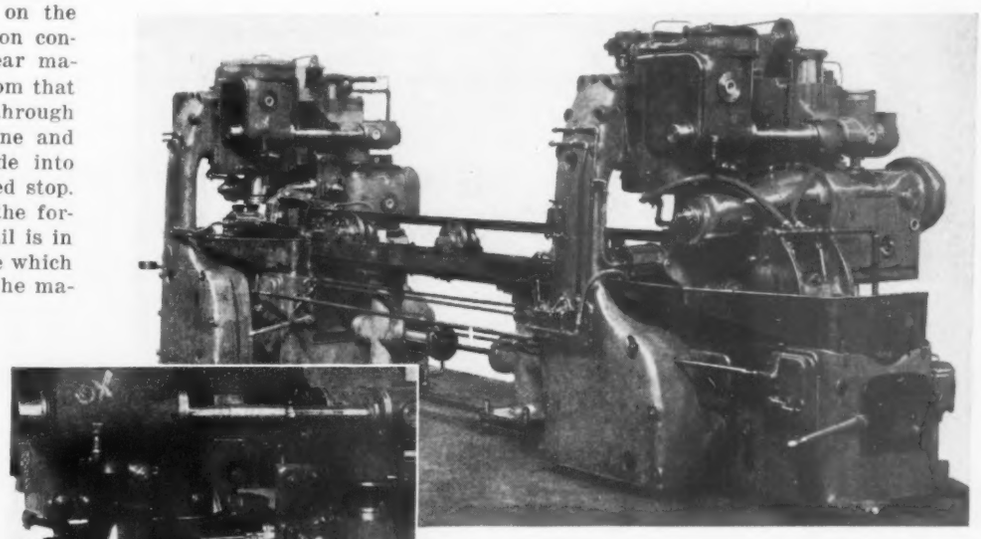


Fig. 2—Two independent hydraulic automatic milling machines arranged to operate simultaneously under centralized control in finishing the ends of elevator guide rails

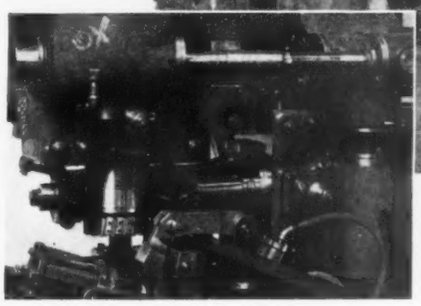
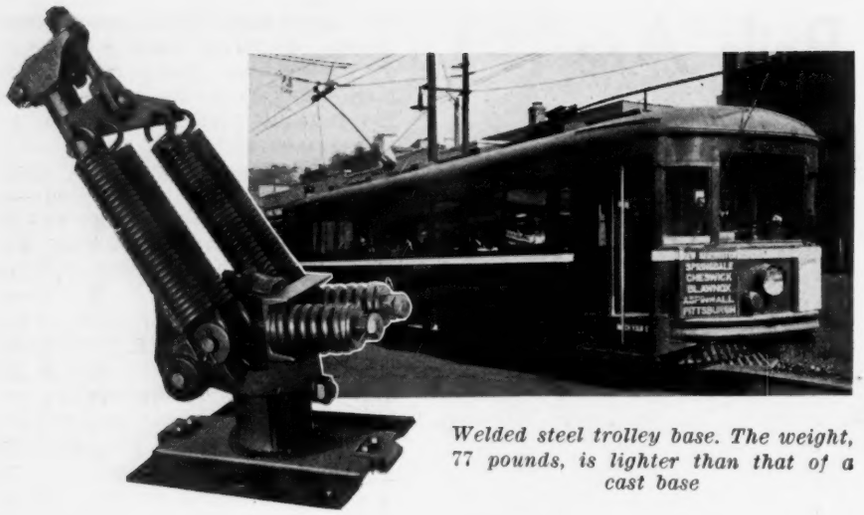


Fig. 3—A close-up view of the horizontal and vertical milling cutters. All movements of the cutters are entirely automatic

Standards for Electrical Machinery Approved

The United States national committee of the International Electrotechnical commission at a recent meeting gave final approval to the revised I.E.C. rules for electrical machinery. These rules, contained in Publication No. 34, were drawn up in their present form at the commission's plenary meeting in Oslo in July, 1930, but it is the culmination of a revision which had been in process for ten years, during which time it was a subject of much consideration and debate at seven formal international meetings. Offices of the United States committee are at 33 West Thirty-ninth street, New York.



Welded steel trolley base. The weight, 77 pounds, is lighter than that of a cast base

Large Uses of Steel in Small Ways

189th Article ◆ Street Car Trolleys

WANING popularity of the street railway car as the result of inroads made by gasoline vehicles as yet has made no marked reduction in demand for certain railway parts for new equipment and replacement purposes. Among these is the trolley, the long pole which has been characteristic of the electrically driven cars since their first appearance on the streets of American cities years ago. Use of a third rail or underground system for supplying current has removed the overhead transmission lines for some communities, but there still remains a market for 4000 to 5000 of the roof-type units annually.

Rolled Steel Parts Used

Manufacture of this product represents an annual steel consumption of 250 to 300 tons yearly, the bulk of which is required for the trolley base. A popular and typical type of base shown above illustrates the trend toward use of welded rolled steel material, which has resulted in a reduction in weight from the older type employing a cast base. This part weighs 77 pounds and is constructed by using rolled steel for the base itself, heat-treated steel tubing for the pole socket and cast steel for the turret. Two sets of roller bearings permit easy and quiet operation of the swivel. A hinged clamp at the top of the socket holds the pole firmly in place.

Two sets of steel springs are used, one to provide pressure in holding the pole against the trolley wire, while the other serves as a buffer to stop oscillation of the pole in case the wheel leaves the trolley wire. In some types of bases a rubber buffer replaces the springs.

The trolley pole for the base illustrated is of steel tubing varying from 1½ inches in diameter at its base to 1 inch at the point where the harp and wheel are affixed. These three parts weigh about 50 pounds, making the total weight of the unit around 125 pounds. Larger bases and poles than the ones mentioned are employed on certain types of railway equipment, while electric locomotive service employs a pantograph for overhead contact or a shoe device for receiving current from a third rail.

732-Mile Pipe Line Is Arc Welded in Field

A new long distance pipe line which will be used for the transportation of petroleum products from the oil fields of Oklahoma to refineries in Ohio and western Pennsylvania recently has been completed. The line, originating in Perryman, Okla., was constructed by the Gulf Pipe Line Co. of Pennsylvania and consists of a main line 732 miles long, of 10-inch pipe, and a branch line 51 miles long, of 8-inch pipe.

The main line of the project runs from the oil fields of Oklahoma to Spencerville, O., and from there to Toledo and Pittsburgh, by way of the old Buckeye Pipe Line Co.'s line. The branch line is taken from the main line at Dublin, Ind., and extends to refineries at Cincinnati.

Construction of this line involved practically all the latest developments in efficient pipe line construction, including arc welded joints in the firing line. Seamless tubing and lap-welded pipe, equipped with double bell and chill band joints, were used. Pipe lengths averaged approximately 40 feet and weighed 40 pounds per lineal foot. Each pipe length is belled at both ends and the ends are beveled so that in arc welding the joint the weld penetrates through to the chill band, producing a strong and rigid joint. Welding machines for the work were furnished by the Lincoln Electric Co., Cleveland.

When in full operation the line will be served by 14 pumping stations, each equipped with oil engine driven reciprocating pumps. Working pressure of the line will be approximately 700 pounds per square inch, with a capacity of nearly 40,000 barrels per day.

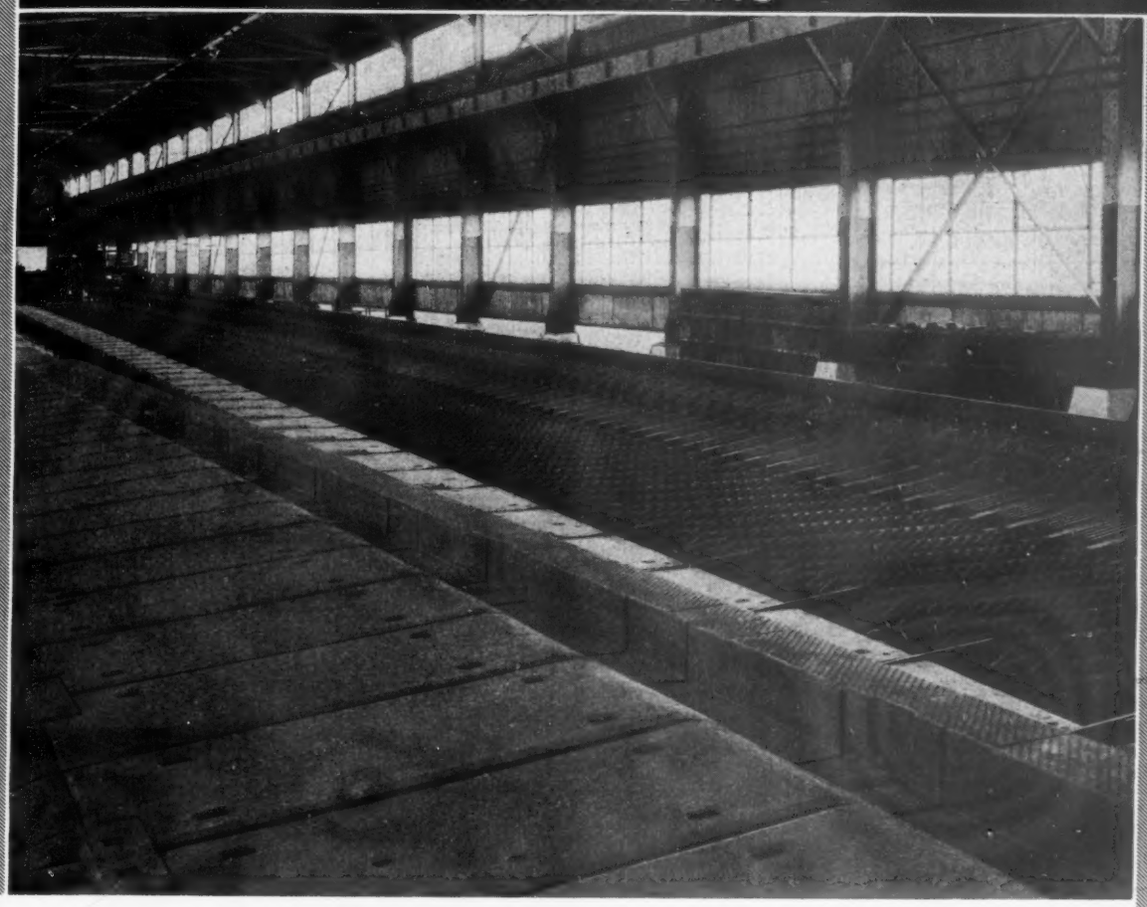
Compressive Tests Made on Jointed Steel Columns

The bureau of standards *Journal of Research* for February contains a report of tests recently completed in cooperation with the American Bridge Co. on the compressive strength of jointed H-shaped steel columns. The bureau has undertaken the study of many problems in connection with the construction of buildings. Some of these cannot be solved satisfactorily by the construction industry with laboratories available. For example, if the strength of full size steel columns of the type under consideration is to be determined, large testing machines are required. Many tests of these important structural members have been made at the bureau using the hydraulic compression machine of 10,000,000 pounds capacity.

In steel structures fabricated either by riveting or welding, it is customary to use rolled steel columns having an H-shaped cross section. If a smaller column is used above a larger one a steel plate is usually placed between the ends of the columns so that the entire end of each column is in contact with the plate. Although these plates have been used for many years, structural engineers do not agree upon the thickness of the plate which should be used for any particular condition. It was to obtain experimental data upon the distribution of the stresses in the end of the columns and in the plate that these tests were undertaken by the bureau of standards.

MESTA MECHANICAL COOLING BED

FISK PATENTS



The MESTA Mechanical Cooling Bed (Fisk Patent) was developed to meet the needs of the high grade Merchant Mill and is designed to handle a variety of products such as rounds, squares, shapes, flats and irregular sections. Any of these products may be cooled slowly in close formation or rapidly in spaced formation. Care has been taken to avoid scratching or marking of products and the entire bed surface is machined including the grooved bed members.

MESTA MACHINE COMPANY

Pittsburgh, Pa., U. S. A.

Mesta

Insulation Beneficial to Open-Hearth Practice

(*Concluded from Page* 38)

charged on undepreciated balance.

Column D shows the increased cost per square foot on the various thicknesses of walls where the insulation of high and low-temperature insulating brick or high-pressure block, is substituted for a like thickness of firebrick. The labor being practically the same, column D shows principally the added cost of the material itself over the firebrick material it displaces.

First-quality firebrick are figured at a rough price of $40 a thousand, low-temperature insulating brick at $60 a thousand, high-temperature insulating brick at $75 a thousand and the high-pressure block at 65 per cent off a list price of 30 cents a board foot. Insulating concrete is figured at $1.75 a cubic foot in place.

A labor cost of $30 a thousand has been used for insulating brick and firebrick, including fire clay or mortor, scaffolding, cartage and all other expenses. A labor cost of 5 cents a square foot for laying insulating block up to 3½ inches is used and a labor figure of 7 cents a square foot for laying blocks of 4 inches or over. Insulating concrete labor has been figured at the rate of 40 cents a cubic foot in place which includes all labor mixing, ramming, leveling, etc., but practically no form work.

Savings Are Tabulated

Column E shows the loss of each wall expressed in terms of B.t.u. a square foot of regenerator wall and is based on a furnace temperature of 2455 degrees Fahr. and an air temperature of 100 degrees Fahr.

Column F shows the heat saving a square foot an hour in terms of B.t.u. between the various insulated wall constructions and 18 inches and 22½ inch firebrick walls. Column G shows the value of heat saved annually a square foot figured at 27½ cents a million B.t.u. which is a fair average to use for open-hearth fuel. Column H shows net value of heat saved expressed in terms of dollars a square foot a year. Column B shows return on investment in percentage of first cost of insulation, namely, net value of heat saved a year, (column H), divided by the cost of an insulated wall over a noninsulated wall, (column D).

The tabulated data show that the thin wall and a high-efficiency insulating material give the largest return. Where a heavy refractory firebrick wall is required to protect the insulating materials for their structural strength, the benefits of the insulation are reduced considerably.

Fig. 2 shows a section of an open-hearth regenerator chamber in which the gas and air pockets have a common center wall. The gas chamber arch is flatter than the arch used on the air chamber. This is done to prevent the increased expansion of a larger arch of the air chamber pushing the skewback over on the common center wall and allowing the larger arch to collapse, which then would allow the smaller arch to do the same. It is found when insulation is applied on firebrick it increases this expansion and therefore, it is recommended these stresses be figured so as to be equalized. The rider tile are carried on a series of small arches running across the regenerator chamber. The materials used in wall construction are the same as described previously where an 18-inch firebrick wall was used.

Heat Return Is High

Fig. 3 shows a regenerator construction of which the gas and air chambers are independent units. The side walls of this equipment are 13½ inches of firebrick with high-temperature insulating brick used throughout. The base of the regenerator and the span under rider walls are insulated with two 2½-inch courses of high-temperature insulating brick faced with 2½ inches of firebrick. This construction allows the largest amount of checkers for outside regenerator dimensions and gives a high heat return from the insulated walls.

Fig. 4 shows insulation of open-hearth regenerator flues in which low-temperature insulating brick are used in back of firebrick, and also, the construction recommended when the flue is in moist ground. This shows a concrete cap for water protection. This cap is protected from heat by low-temperature insulating brick and from expansion by insulating cement. The steel pan section is a special arrangement of firebrick and high-temperature insulating brick in place under chambers.

20 Students To Complete Steel Bridge Designs

Out of 138 students of engineering and architecture who submitted preliminary drawings in the 1931 bridge design competition conducted by the American Institute of Steel Construction, ten engineering and ten architectural students have been selected to complete their designs and submit finished renderings for final judgment.

Students in 30 institutions in 19 states and provinces in the United States and Canada participated in the preliminary competition which was judged on April 2 by a jury consisting of Dr. Ralph Modjeski, consulting engineer; Dr. Shortridge Hardesty, consulting engineer; H. H. Murdock, architect; Clinton Mackenzie, architect; and F. E. Schmitt, editor, *Engineering News-Record.*

The 20 students selected to submit finished drawings will compete for three cash prizes in each division. The first is $500; second, $250; and third, $100. These drawings will be judged on May 1 by the same jury.

No Lost-Time Accidents in Nearly 4 Years

Seventeen days short of four years without a lost-time accident is the record of the Special Products plant of the Westinghouse Lamp Co., Bloomfield, N. J. With an average of 175 employes this plan worked 1,168,440 hours without a lost-time accident. Close adherence to safety regulations, precautions by the employes and rigid supervision by those in charge were cited as reasons for the accomplishment.

High honor record for all division in the Westinghouse Lamp Co. now passes to the Milwaukee plant which has run up a total of 1,076,059 hours without a lost-time accident as of March 1, 1931.

This remarkable record terminated a good showing in the third annual state-wide interplant safety contest conducted by the New Jersey department of labor from Oct. 1 to Dec. 31, 1930. Of the eight Westinghouse Lamp company plants entered, seven completed the period without a lost-time accident. Two of the eight were group winners; one topping a group of 14 like industries; the other leading a group of seven industries.

Lamme Medal Is Awarded

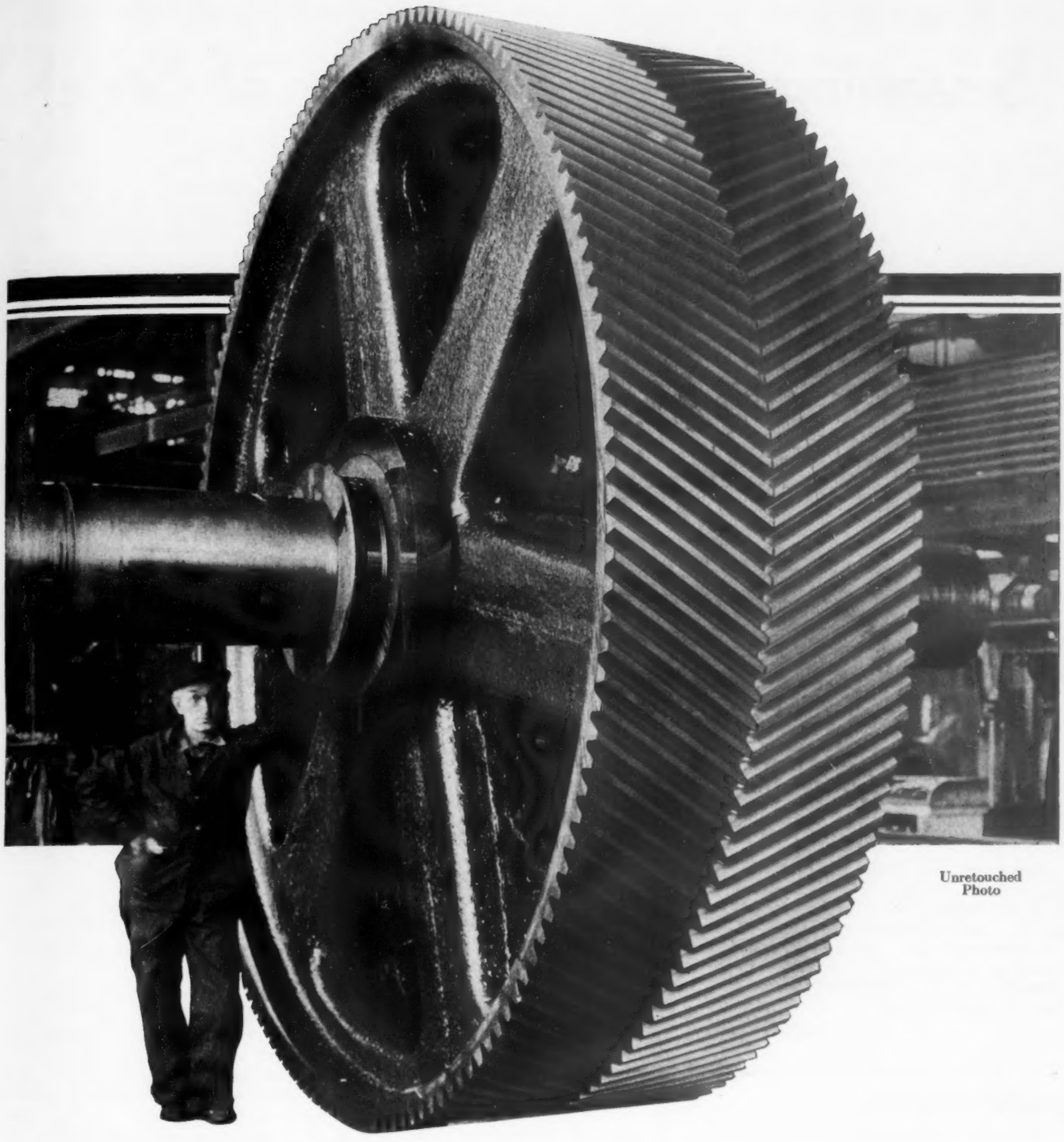
The Lamme medal of the American Institute of Electrical Engineers has been awarded to Dr. William J. Foster, Schenectady, N. Y., for his contributions to the design of rotating alternating current machinery, and will be presented at the summer convention of the institute, to be held in Asheville, N. C., June 22-26.

Builds Motor for Shear

In the article describing the operation of the rotary flying shear on page 44 of the April 9 issue of STEEL, the name of the manufacturer supplying the motor unintentionally was omitted. The motor was built by the General Electric Co., Schenectady, N. Y.

Refractories Group To Meet

American Refractories institute will conduct its annual spring meeting May 25-26 in Hotel Greenbrier, White Sulphur Springs, W. Va. The program is to be announced later.



Unretouched Photo

that its 145 teeth be cavity free

—Farrel Birmingham Co., Inc. of Buffalo, N. Y. selected Birdsboro to cast this 5000 HP gear for one of its large customers in the steel industry.

Weighing 51,700 pounds, this gear blank was cast in one piece, hub split, of Birdsboro open hearth steel . . . a carbon steel that runs uniform throughout; that machines clean and holds true to physicals.

Whether it be the complete mechanical installation requiring full design, or a single casting to your own pattern—Birdsboro houses an organization most skilled in the arts of the founder and his coordinates.

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Scanning the Technology of Steel

A Digest of Important Developments in Scientific Research, Engineering Progress and Operating Procedure Pertaining to the Production, Processing, Application and Performance of Steel

USES:

Steel Castings

Some conditions the engineer should keep in mind when designing steel castings for machine parts, first installment of two, by Maj. R. A. Bull, in Machine Design, April 1931, *p.* 36, 4 *pp., 7 illusts.*

To prevent such undesirable features as varying grain size, dendritic structures, segregation, shrinkage cavities, etc., a steel casting should be designed for approximately the same thickness in every member; that is, a steel casting should have as much similarity as conditions of use permit, in respect to member thickness. The skilled steel founder can overcome the effects of varied cooling rates in castings having members of varying thickness, but the foundryman would prefer not to use them due principally to the expense involved.

Increased collaboration between designer and founder would dispense with the necessity for such devices as chills, water-jacketed molds, etc. Photomicrographs are reproduced showing various structures, both satisfactory and unsatisfactory, encountered in steel castings.

STEEL, 4-16-31

PRODUCTION:

Nitrogen Absorption

Report of investigations covering the absorption of nitrogen by steel, by R. S. Dean, bureau of mines report 3076, 8 *pp., 2 illusts.*

Although not conclusive, evidence strongly points to silicon as the principal offender in introducing nitrogen into steel. The known effects of nitrogen in steel are such that the steelmaker will soon be called upon to control its content in at least part of his metal. At present there is no proved method for doing this. Perhaps the best step toward such control is to control the impurities, particularly the silicon content of the metal. The report cites many contradictory statements concerning the percentage of nitrogen which must be present to produce given effects on the properties of iron and steel.

STEEL, 4-16-31

FABRICATION:

Cutting Compounds

Most efficient cutting compounds for different operations on various metals, discussed by Charles O. Herb, in Machinery, April 1931, *p.* 569, 4 *pp., 4 illusts.*

Three million gallons of cutting compounds is required a month by plants of the Ford Motor Co. when they are operating on a normal basis. The compounds are mixed at the Rouge plant and those intended for other plants of the company are shipped in barrels from the mixing room, ready to be used after water has been added in prescribed proportions. The article gives formulas that have been adopted for different operations, and explains the means employed in the shop to keep the soluable oil in good condition from a sanitary standpoint.

STEEL, 4-16-31

Heat Treated Rail Ends

Description of a method for hardening ends of rails to prevent batter, by M. D. Bowen, in Metal Progress, April 1931, *p.* 33, 6 *pp.,* 5 *illusts.*

It has been proved by experience that the ends of standard railroad rails are being overloaded by present main line traffic, and since these loads are resisted successfully by harder and stronger metal, laid on by welding, it occurred to the maintenance engineers of a western road that the same effect could be achieved by hardening and toughening treatment applied to the extreme ends of new rails.

Experiments vouchsafed the success of the process. The rail ends are heated with an oxyacetylene flame to 1500 degrees Fahr., slowly enough so the temperature gradient through the cooler metal surrounding the hot spot will not cause high differential expansion and cracking, but rapidly enough to localize the heat. The heated area is then quenched rapidly and reheated to 650 degrees Fahr. to draw the temper.

Prior to heat treating a V-notch ¼-inch wide by ⅛-inch deep is ground at the abutting rail ends, thus chamfering the corner where the running surface of the rail ball is cut off square. This is done to provide a false expansion gap to keep the top surfaces of the end of the rail from touching and also to provide a buttress to support the metal at the top surface at the end of the rail. Equipment and procedure have been developed to heat treat about 500 joints per day in this manner.

STEEL, 4-16-31

MISCELLANEOUS:

Sheet Steel Enamels

A report of an investigation of the effect of smelter atmospheres on the quality of enamels for sheet steel, discussed by A. I. Andrews and E. A. Hertzell, in University of Illinois bulletin, No. 224, 15 *pp.,* 4 *tables* 4 *illusts.*

In the enamels studied all the sodium carbonate and sodium nitrate were decomposed during the first 40 minutes of smelting. When the enamel batch contained sodium nitrate the smelter atmosphere showed a higher percentage of oxygen during the first 40 minutes than when this constituent was lacking. Atmospheres containing 96 to 100 per cent of nitrogen and 93 to 100 per cent of carbon dioxide in the smelter were not deleterious to the enamels. Reducing atmospheres in the smelter were not deleterious to the enamels. When the enamels smelted in a high-sulphur dioxide atmosphere were burned in air, pock marks appeared. Blistering also occurred on the ground coat. Nitrogen, carbon dioxide and reducing atmospheres are not deleterious to enamels for sheet steel such as those used in this work during the smelting process whereas sulphur dioxide in the smelter atmospheres is deleterious to enamels for sheet steel according to the author's conclusions. Additional work on other types of enamels will make possible additional conclusions.

STEEL, 4-16-31

TREADWELL

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Hot bed for strip mill—fully automatic, roller bearing equipped, with all gears enclosed and running in oil.

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(Abramson Design)
Special Machinery
Electric Furnace Steel Castings
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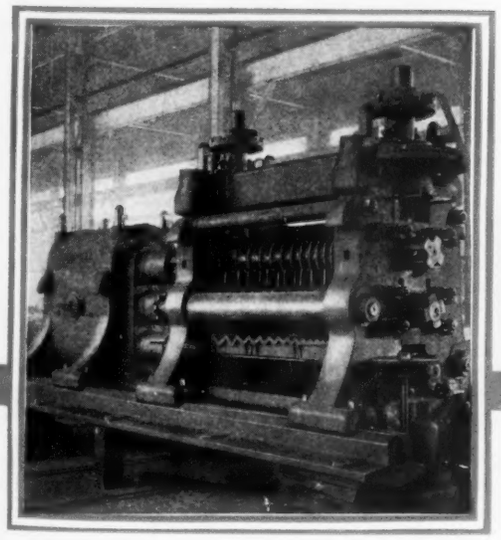
Hi-Test Iron Castings

16" Three-High Bar Mill



BETTER GRADE MACHINERY

Treadwell Engineering Company
Easton, Pa.

Machine Tools and Plant Equipment

«Without machine tools modern machinery could not be built.»
—Joseph W. Roe

Control Gage Designed for Centerless Grinders

Cincinnati Grinders Inc., Cincinnati, has developed an attachment for its standard No. 2 centerless grinders which automatically controls the size of the work, thereby obviating the necessity of constant checking of work and adjustment of the feed wheel slide. When used in conjunction with automatic work-feeding hoppers, these automatic sizing devices make it possible for one man to operate a battery of two or three machines. The accompanying illustration shows the working portion of a centerless grinder equipped with the sizing device, in operation.

Compensates for Wheel Wear

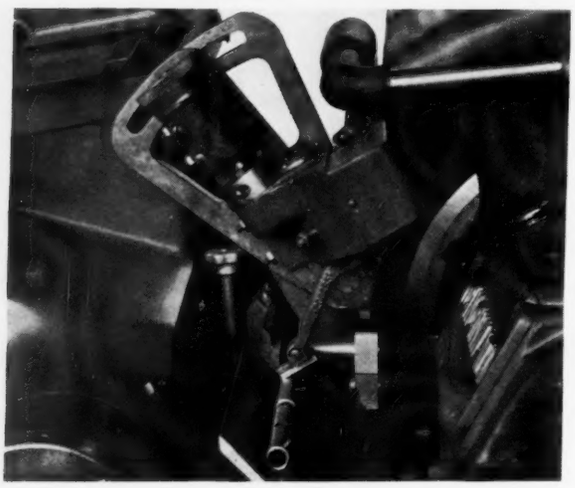
The mechanism is comparatively simple. An electric contact gage is mounted on the rear of the work fixture, its closely adjusted gaging member being so arranged that as the diameter of the work increases slightly, due to the wearing down of the grinding wheel, it follows the changing diameter of the work with an arc movement. The gaging member can be adjusted so that an increase in diameter of 0.0001-inch on the work will cause an electric contact to be established through a small mercury switch mounted close to the pivot end of the gaging arm.

The resulting current flow energizes a solenoid connecting a valve on the feed mechanism, which by hydraulic means operates the infeed slide screw. Provision is made, by means of a ratchet and pawl adjustment connected to the worm shaft, to operate the feed slide nut so that infeed movement of the slide as fine as 0.0001-inch can be obtained.

An adjustable needle valve on the exhaust port is set to delay return of the feed piston for the interval required for the work ground during this adjustment to pass between the gage contacts. In case the work still is too large, the feed will operate again. On the other hand, if correct size has been restored, the gaging member will return to normal position and the contact will be broken, no further action of the feed mechanism taking place. All backlash on the feed screw is eliminated by means of a hydraulic cylinder attached to the machine bed.

The attachment readily is adjustable for any angularity of blade and for various diameters of work. When occasion demands it may be rendered inoperative or entirely removed from the grinder.

Keller machine with precision control speeds up jig boring



Production by the use of centerless grinding is speeded up, and losses due to inaccurate work are avoided, by an automatic wheel controlling gage of combined mechanical and electrical type developed by Cincinnati Grinders Inc.

Precision Jig Borer Has Electric Table Stop

Keller Mechanical Engineering Corp., 70 Washington street, Brooklyn, N. Y., announces a new precision machine, shown in the accompanying illustration, for speeding up jig boring and layout work. Attention has been paid to proportion and to distribution of metal, to insure maximum rigidity. The driving mechanism, including a magnetic clutch, is inclosed in the box-shaped bed. An extra large and heavy chrome-nickel steel spindle runs in precision ball bearings. The ½-horsepower spindle drive motor is mounted on a sturdy hinged bracket, easily adjustable for belt tightening. The substantial overarm is gibbed and is vertically adjustable through 6 inches by means of a crank.

Eight spindle speeds are provided ranging from 77 to 1750 revolutions per minute, four through open belt and four through back gears. Two reversible automatic feeds, 0.002 and 0.005-inch, are available, also choice of handwheel and hand lever feeds. A positive automatic depth stop, with scale and pointer, is attached to the spindle head.

Settings are determined by direct readings on longitudinal and transverse vernier scales. Without moving work or table, scale and vernier are lined up by means of an adjustable screw, the graduations being read through a ten-power flat field magni-

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A COMPREHENSIVE SYSTEM OF WAREHOUSES ORGANIZED TO SERVE BOTH THE SMALL AND THE LARGE USER OF STEEL

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UNIFORM QUALITY
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DEPENDABLE DELIVERIES
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Because J & L *production* is geared to distribution and distribution is geared to *local needs*, you can always order from your J & L Warehouse and *be sure* of receiving steel of the quality you want, the shapes you want, the delivery you want.

J & L *is organized* to serve you. Owning and controlling its mines and mills, it exercises constant supervision over all raw materials and processes of manufacture, continuously applying the lessons learned in 80 years of iron and steel making.

J & L Warehouse stocks provide, for every need, the right quality of steel in a full range of sizes. They offer uniformity that lets you duplicate today's order tomorrow, next week or next year. They offer an experienced personnel that quickly understands your steel requirements, and intelligently informs you of the availability of suitable J & L Warehouse stocks. They offer deliveries that give you, in effect, a steel mill in your own back yard.

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FOR EVERY NEED... THE RIGHT QUALITY OF STEEL IN A FULL RANGE OF SIZES...

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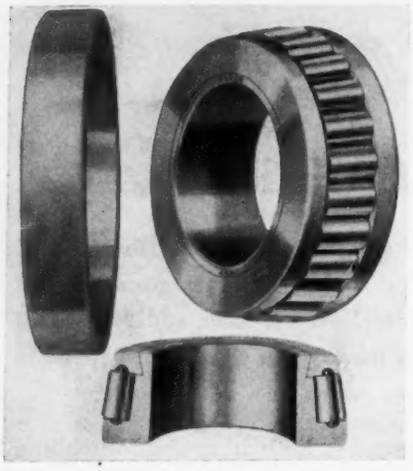


Cageless bearing developed by Tyson Roller Bearing Corp.

fying glass, equipped with built-in electric light. The operator reads his decimal direct from the blueprint and sets the vernier accordingly.

Snapping a toggle switch then causes the table to move at uniform speed as the magnetic clutch actuates the leadscrew, and the instant that a contact on the table touches the anvil of the vernier slider, the magnetic clutch releases the lead screw and stops the table in location with accuracy of 0.0002-inch. An ingenious lock prevents slippage of the table on its oil film, thereby retaining the setting. This automatic electrical method of work setting insures that the precision is entirely unaffected by wear on the lead screw or other moving parts. An important time saving feature of the mechanism is that one hole can be bored while setting for the next.

Specifications of the new jig borer include: Table travel, horizontal 18 inches, transverse 12 inches; working surface of table, 14 x 21 inches; distance from spindle end to top of table, 2½ inches minimum, 14½ inches maximum; distance between center of spindle to face of column, 14 inches; vertical adjustment of spindle bracket, 6 inches; travel of spindle quill, 6 inches; overall dimensions, 55 x 45 x 78 inches high; and approximate weight 1375 pounds.

◆

Cageless Roller Bearings Have High Load Capacity

Tyson Roller Bearing Corp., Massillon, O., announces production of a new type of precision roller bearing of the taper type. The accompanying illustration shows one of these bearings with its cup, also a section view showing the method of holding the rollers in place without using a cage.

Elimination of the cage allows room for from 20 to 50 per cent more rollers, which gives this bearing relatively high load carrying capacity. Greater durability, less heat-generating and better heat-dispersing ability also are claimed by the manufacturer.

Positive roll alignment, both longitudinal and vertical, is attained by the use of a double ribbed back plate at the big end of the rolls. The shoulder of each roll gets a bearing on the inside rib of the back plate, and also additional bearing on an outside rib. Pintles at both ends of the rolls extend into annular grooves in the back plate and in a closed ring at the front which is held in place on an annular dovetail on the cone. The pintles and grooves have no other function.

Because of inherent alignment of rolls and freedom from undue heating these bearings are said to operate safely and dependably under full load at unusually high speeds.

The new bearings are made in all S.A.E. sizes and are interchangeable for all standard types of antifriction bearing installations, accepted industrial and automotive applications having been studied carefully in determining the standards for the complete line.

◆

Arc Welding Electrode for Corrosion-Resisting Steel

Lincoln Electric Co., Coit road and Kirby avenue, Cleveland, announces an improved electrode for use in arc welding corrosion-resisting steel.

This new electrode, which is an extruded material, is used with the usual polarity of the welding current reversed. Carbon, frequently used as an arc stabilizer, is entirely absent in the coating of this electrode, which eliminates the possibility of carbon absorption by the molten weld metal. As a result, the carbon content of the weld metal deposited by this electrode always will be equal, or less, than the carbon content of the alloy steel being welded. This has an important bearing upon the resistant qualities of the weld, since a slight increase in its carbon content brings about more rapid corrosion. Inasmuch as a shielded arc is used in this welding, the formation of oxides and nitrides likewise is precluded.

In spite of the high tensile strength possessed by this new weld metal, ductility is in no way sacrificed. Fine grain structure and no porosity also characterize the deposited metal. The electrodes are furnished in 3/32, ⅛, 5/32, 3/16 and ¼-inch sizes in the standard 11-inch lengths.

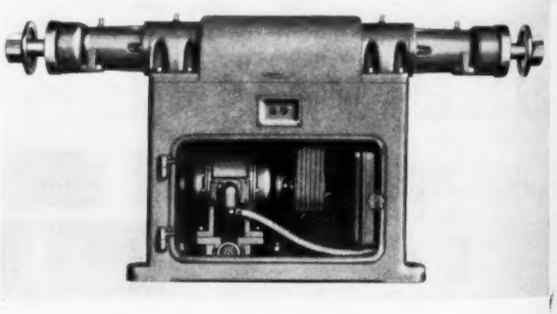
◆

Buffing Machine Features Antifriction Spindle

Hisey-Wolf Machine Co., Cincinnati, has placed on the market a heavy-duty buffing and polishing machine, the spindle head of which is equipped with ball or tapered roller bearings, as desired, and driven direct from a motor in the base by means of multiple V-belts. The machine is shown in the accompanying illustration.

The neat box frame provides rigid mounting for the unit-type spindle head, the bearing housing being held in permanent alignment with the frame by means of a key running its full length. Easy access to motor, starter, pulleys and belts, is afforded by a large door in the front of the frame. The ball-bearing motor is mounted horizontally on a sliding dovetailed base. Proper belt tension is maintained by adjusting the motor on the base by means of a lead screw operated by a handwheel. Wheel arbor ends have flat topped threads which, in connection with their bronze safety wheel nuts, are said to afford unusual security in holding buffing wheels.

Overall length of the spindle is 82 inches, projection of spindle at each end is 15 inches, and net weight of the machine is 2600 pounds. Motors of 10 or 15 horsepower are recom-



Heavy-duty buffing and polishing machine having double-end antifriction bearing spindle, developed by Hisey-Wolf Machine Co.

MANUFACTURERS who use steel sheets in the fabrication of their products . . . whether in large, heavy commodities or small novelties . . will find Youngstown prepared to supply a sheet that is exactly suited to their specific requirements. Youngstown sheets are dependable . . . manufactured from carefully selected steel . . . uniform in quality . . . accurately rolled to gauge.

If you are faced with any problem involving the use of sheet steel, a Youngstown representative will be glad to consult with you and advise the best sheet for your particular purpose. This service entails neither cost nor obligation. A phone call, wire or letter to the nearest Youngstown office will bring an immediate reply.

• YOUNGSTOWN •

THE YOUNGSTOWN SHEET & TUBE COMPANY

One of the oldest manufacturers of copper-steel, under the well-known and established trade name "Copperoid"

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CINCINNATI · · · Union Trust Building
CLEVELAND · Terminal Tower Building
DALLAS · · · Magnolia Building
DENVER · Continental Oil Bldg.
DETROIT · · · · Fisher Building
KANSAS CITY, MO. · · Commerce Building
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MEMPHIS · · · 42 Keel Avenue
MINNEAPOLIS · Andrus Bldg.
NEW ORLEANS · · · Hibernia Building
NEW YORK · 30 Church Street
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PHILADELPHIA · · · Franklin Trust Building
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GALVANIZED SHEETS PROTECT · SAVE WITH STEEL

Extractor for broken screws, made by Greenfield Tap & Die Corp.

mended, depending upon the nature of the work.

◆

Self-Feeding Extractors Remove Broken Screws

Greenfield Tap & Die Corp., Greenfield, Mass., has put on the market a new line of extractors for use in removing broken screws and studs, also pipe fittings and other screwed-in elements difficult to remove by the use of ordinary tools. One of these extractors is shown in the accompanying illustration.

The design of these extractors causes them to be self-feeding into holes drilled into broken screws, etc., by simply turning them, no hammering being necessary. As soon as one of these tools takes its bite into the work, the broken element can be turned out on its own threads with minimum effort and with no damage to surrounding parts. When an extra strong pull is demanded, on account of jammed or rusted threads for instance, these extractors will stand it, being of high-grade tool steel heat treated to resist heavy torsional strain.

Thirteen sizes are designed to cover all ordinary machine shop requirements. These can be had in six convenient cased sets containing the most frequently used sizes for various specific purposes.

◆

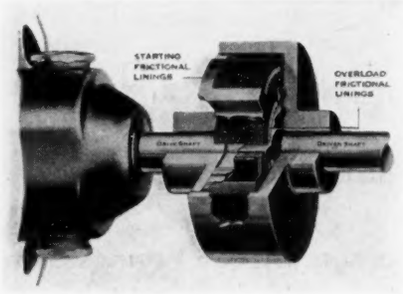
Starter and Coupling Unit Absorbs Overloads

Washburn Shops of Worcester Polytechnic institute, Worcester, Mass., is manufacturing for the trade a compact and simple automatic starter and flexible coupling for use on electric motors and other types of drives.

The manufacturer claims that this device greatly reduces peak load requirements for driving units, absorbs shocks and reduces wear and tear on both driving and driven units, improves power factor and cuts cost of motor and starter equipment. The cutaway view of the unit, which appears herewith, gives a clear idea of its simple design.

It consists of two cup-shaped cast iron members, the smaller one keyed to the motor or driving shaft and the larger one keyed to the drivenshaft. Between these, in annular pockets, are an inner and an outer set of floating segments made of brake lining reinforced with lead. Sufficient lead is used to give the required pressure on the friction surfaces to carry the load when centrifugal force is developed through rotation.

When power is applied to the driving member, it comes up to speed almost instantly, there being no immediate resistance to its action. Then, when it reaches full speed, centrifugal force comes into action and causes the outer set of floating segments to bear outward against the



Coupling developed at Washburn Shops picks up load smoothly

inside of the cup of the driven member, with sufficient friction to cause that member to pick up speed gradually and smoothly.

It would appear that in starting a load with a clutch capacity for only the rated power of the motor the period of slippage might result in the generation of an undue amount of heat. That possibility is obviated, and sufficient overload capacity is assured, by the inner set of centrifugal linings floating in annular pockets on the internal hub of the driven member. As soon as this driven side starts to revolve, centrifugal action comes into play to throw this inner set of segments against the friction surface on the inside of the cup in the driving element, thus giving an auxiliary driving effect. This auxiliary action can be varied to suit specific load and overload requirements.

The design is such that the outer or starting segments never can have a greater driving capacity than the rated driving power of the motor. This throws any overload entirely upon the inner segments, which act only when the driven side has come up to full speed. For example, a 10-horsepower motor running at 1800 revolutions per minute ordinarily has 10-horsepower capacity starter linings and 4-horsepower capacity overload linings, giving a total starter capacity of 14 horsepower.

The starter is furnished in 24 standard sizes with horsepower capacities ranging from 3 to 300, and with speed range from 495 to 1760 revolutions per minute. Those for other powers and speeds, and of pulley type, can be furnished on special order.

◆

Tiering Truck Handles Dies Weighing 25 Tons

Elwell-Parker Electric Co., 4205 St. Clair avenue, Cleveland, has delivered a special gas-electric tiering truck of unusual size and power. This machine, which weighs approximately 13,000 pounds, is designed expressly for handling big metalworking dies such as are in common use in automobile body plants. Some of these dies weigh as much as 25 tons, but by means of this specal truck it is an easy matter to take them from storage, to transport them to the press, lift them into position, and later on to remove them. In the accompanying illustration one of these trucks is shown transporting a die weighing 30,000 pounds.

The truck has six wheels, the two drivers having 22 x 6-inch tires, while the four front wheels have 15 x 5-inch tires. All wheels are mounted on automobile type drop forged alloy steel knuckles set on the tire center line. To accommodate the running gear to uneven runways, the front axle is pivoted on a large pin block of forged alloy steel, which is bolted between the ends of two heavy rolled bar center sills running

Special Elwell-Parker truck handles large dies for press work

back to the main frame of the truck.

The cantilever type load platform, which is fabricated from heavy structural and bent plate members, has no support at its forward end, the entire weight being carried on two massive L-shaped steel arms, each provided with two rollers on which they travel up and down the vertical members of the main frame. The load platform is elevated by a powerful electric winch mounted between the power plant and the uprights, control being immediately in front of the operator.

In addition to elevating the load, the motor of this winch drives a countershaft carrying cable drums at each end, beyond the edges of the load platform. Through a system of sheaves, cables on these drums are made to slide the die from the load platform upon the platen of the press, or to slide it from the press to the truck, as the case may be.

One man rides and steers the machine and is able to put it through all its functions from the driving position, with no more effort than is required to operate an ordinary small tiering truck.

◆

Chain of Files Is Used in New Filing Machine

Grob Bros., West Allis, Wis., announce a new continuous filing machine which is designed for internal and external filing of small and medium size work, particularly tool and die work having deep, flat surfaces up to 4 inches high which must be finished to close tolerances. The machine is shown in the accompanying illustration.

Bandsaw principle is utilized in Grob Bros. filing machine

The bandsaw principle is employed in this machine, a chain of short files running over large diameter pulleys serving as the cutting medium. This chain travels downward through the center of the work table, where it is given substantial support by a back rest. This system gives the files continuous cutting action, as well as unusual accuracy of performance.

A channeled link is welded to the back of each file block, providing not only means of connecting the chain of files, but also insuring positive alignment against their backrest on the work table. This backrest is grooved to guide this link in a positive manner. Connection between file links is by straight links, pins and flat springs. The connections are self-locking and easily disengaged when internal filing demands.

The frame of the machine is made up of two heavy castings, base and head being integral, and the table being adjustable on the frame to allow angular filing. Table adjustment is read by means of a hand and segment gage. The motor is mounted at the rear of the head and has a V-belt drive. Automatic tension is provided. Three filing spreads are available.

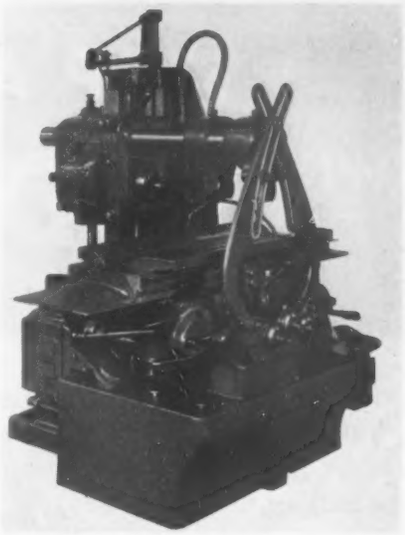
◆

Plain Milling Machine Has Many Refinements

Brown & Sharpe Mfg. Co., Providence, R. I., has added to its line of milling equipment a plain milling machine of entirely new design. This machine, which is of the high production manufacturing type, nevertheless, can be used to advantage on short run work. The machine has automatic longitudinal feed of 22 inches, transverse saddle adjustment of 6 inches and vertical spindle head adjustment of 13 inches. It is shown in the accompanying illustration.

The machine is one of the unit assembly type of construction, with a substantial and neatly designed bore frame which incloses most of the operating mechanism. Complete control of all operating functions is centralized at the front, including speed changes, feed changes, hand longitudinal adjustment of table, transverse adjustment of saddle, vertical adjustment of spindle head and clamping of spindle head. Each of these functions is controlled by its individual lever, and it is unnecessary to leave the operating position to reach any control.

Automatic control of the table is given by adjustable dogs at the front, several cycles being available with the standard set of dogs. Fast power travel and cutting feed for the table are available in both directions. Hand control, by a single directional control lever on the front of the saddle, is provided.



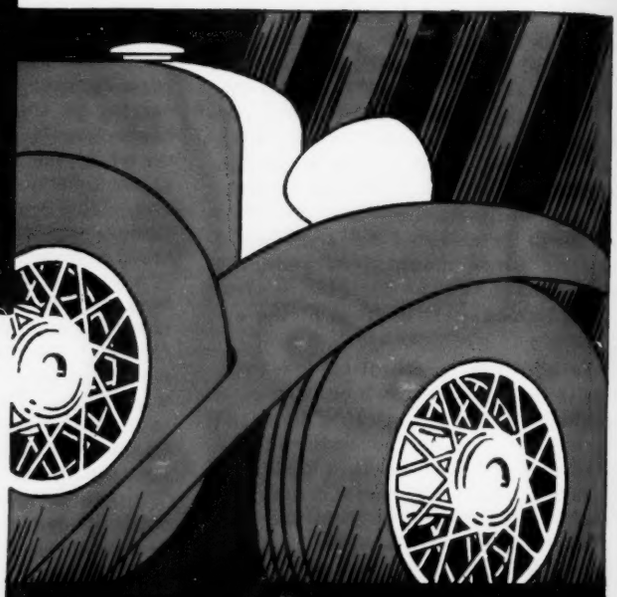
Brown & Sharpe plain milling machine has many design refinements

The spindle is mounted on four precision antifriction bearings and can be set to rotate in either direction. Also, it can be set to rotate continuously or to stop simultaneously with the engagement of fast power travel of the table, and to start with engagement of cutting feed. When set for automatic operation, the directional control lever on the front of the saddle also controls the functioning of the spindle. Sixteen spindle speeds in practically geometrical progression from 25 to 620 revolutions per minute, and 16 feed changes ranging from 1 to 38½ inches per minute, are available. Direct reading dials above the levers indicate speed or feed settings.

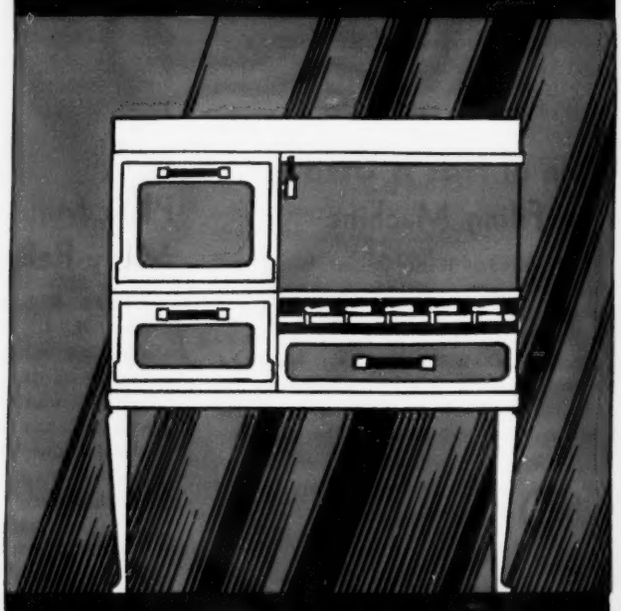
Important Design Features

Antifriction bearings are used generally throughout the machine, provision being made for adjustment in all cases. Automatic lubrication by filtered oil is provided for all mechanism in base and driving unit, pressure greasing for end bearings of table drive shaft, and a single oiling station for saddle and table mechanism. Coolant is under automatic control and has quick return to the reservoir in the base. Wide chip space is provided. Provision is made for the easy application of various attachments furnished as extra equipment when desirable.

KEEPING A STEP AHEAD WITH ENDURO



IN AUTOMOBILE WHEELS



AND KITCHEN RANGES

STYLES must change or sales will languish. Fine cars—fine homes—fine furnishings will always lure those who traditionally must tread the path of the Jones's.

Consider the auto wheel. Wood—then wire—then steel disc—and now comes stainless steel, both wire and formed artillery types. Enduro, Republic's perfected stainless steel, has become the last word in wheel material for members of the fine car class.

From the open road step into the modern kitchen. Gone is the black cast iron range. In its place stands a tribute to the wisdom of the metallurgist and the skill of the metal worker—a range of lustrous beauty—of Enduro.

Are you too close to your own product to see where it might be improved through the use of this never changing smart looking new steel? Do you realize that intensive development of Enduro in America's finest steel research laboratory by the world's largest producer of alloy steels has resulted in many new types—corrosion resistant—heat resistant—easy forming, free cutting—and capable of taking a variety of finishes?

The stainless problems of a few years ago are in the past. Outline your product and its uses, and let us tell you how Enduro might help you to improve your product in appearance or serviceability and keep a step ahead of competition.

ENDURO
REPUBLIC'S PERFECTED STAINLESS STEEL

CENTRAL ALLOY DIVISION
REPUBLIC STEEL CORPORATION
MASSILLON, OHIO

Enduro is sold only through Republic Sales Offices and Authorized Distributors.

Steel Demand Down Moderately

Production Hovers Slightly Above 50 Per Cent—Structural Inquiry Well Sustained—Railroads Are More Active—Sheet and Scrap Prices Are Softer

CURRENT steel demand is not brisk enough to lend any encouragement to those who have entertained hopes that the dip over the past three weeks has been only a temporary reaction, nor has it fallen off sufficiently fast to bear out the contentions of the more pessimistic.

The movement in demand and production continues downward, but the drift is moderate. Production continues to vary in some districts, though the general average still is slightly above 50 per cent, or within six points of the spring peak, attained in the third week of March. Cleveland steelworks operations are down 3 points to 56 per cent; Pittsburgh is off 2 points, to 50; Youngstown is off one point to 44; Chicago continues unchanged at 55.

A most encouraging factor is the sustained volume of structural steel inquiry, which this week is the sum of many small jobs. New inquiry totals 46,000 tons, not including several large pending projects, such as 65,000 tons for the New York Central's warehouse in New York, 40,000 tons for a postoffice in Chicago, and 25,000 tons for the Marshall Field estate building in the latter city.

Actual structural awards for the past week, 20,000 tons, compare with 45,200 tons in the preceding week, and 42,885 tons in the week a year ago. Awards this year to date total 710,000 tons, an increase of 37 per cent over the 517,670 tons in the same period last year.

Automobile production is running ahead of the rate in March, and there are further indications of a continuation of the upward trend in May, and possibly extending into June. Competition for automotive business, however, is so sharp that prices of sheets show more variation. Some makers have again marked down autobody sheets $2 a ton, to 3.10c, Pittsburgh. Competition for black sheet business has prompted two Detroit district mills to set up local bases, at least temporarily.

More activity is apparent in the market for railroad material and equipment. The Great Northern has placed 500 gondolas and the Minneapolis & St. Louis 500 flat cars, while the General American Tank Car Corp. is inquiring for 300 refrigerator cars. The Pennsylvania railroad's 235 electric locomotives, requiring 1000 tons of electrical sheets alone, should be placed shortly. The New York board of transportation has purchased 5500 tons of rails from the Bethlehem Steel Corp.

In heavy finished steel the $1 advance appears to be holding on the small volume of current business. As previously noted, sheet prices continue soft, blue annealed and black being shaded $1 a ton. Semifinished steel prices also are unsettled, concessions being allowed in some recent instances. Cut nails have been advanced $2 a ton. The recurring extreme weakness in scrap prices in most districts is regarded as an ominous portent by many observers.

The market for pipe is featured with an inquiry for 35,000 tons, for a 155-mile link in the Texas to Chicago line.

Pig iron is moving at approximately the same rate as last month, buyers continuing to commit themselves only for immediate requirements. No price changes have occurred in several weeks. Furnace coke is less active than a month ago, and both furnace and foundry grades are a shade easier. The price of iron ore for the season is expected to be formally established this week. Leading producers now estimate shipments this year at 41,000,000 tons, the smallest since 1921.

The United States Steel Corp.'s unfilled tonnage as of March 31, 3,995,330 tons, is an increase of 30,136 tons, or 0.73 per cent over Feb. 28. Presumably the gain is due to the fact the Corporation booked 125,000 tons of structural steel for the Rockefeller Radio City development in New York, and about 26,000 tons of the Pennsylvania railroad's order for 100,900 tons; also, to some reduction in the rate of its operations.

Due to adjustments in sheet prices STEEL's market composite this week is down 8 cents to $31.59.

Composite Market Averages

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe.

This week (April 15, 1931)	$31.59
Last week (April 8, 1931)	31.67
One month ago (March, 1931)	31.66
Three months ago (January, 1931)	31.71
One year ago (April, 1930)	34.44
Ten years ago (April, 1921)	43.84

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	April 15, 1931	March 1931	Jan. 1931	April 1930
PIG IRON				
Bessemer, del. Pittsburgh	$18.26	18.26	18.76	20.76
Basic, valley	17.00	16.75	17.00	18.50
Basic, eastern del. eastern Pa.	17.50	17.25	17.25	18.76
No. 2 foundry, del. Pittsburgh	18.26	18.01	18.26	19.76
No. 2 foundry, Chicago	17.50	17.50	17.50	19.40
*Southern No. 2, Birmingham	13.00	13.00	14.00	14.00
**No. 2X, Virginia furnace	18.25	18.25	18.25	18.25
**No. 2X, Eastern del., Phila.	18.26	18.26	18.26	20.76
Malleable, valley	17.00	17.00	17.50	19.00
Malleable, Chicago	17.50	17.50	17.50	19.40
Lake Superior, charcoal, del. Chi.	27.04	27.04	27.04	27.04
Gray forge, del. Pittsburgh	17.63	17.38	17.63	19.13
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	103.79

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $11, Birmingham. **2.25 to 2.75 silicon.

COKE				
Connellsville furnace, ovens	2.50	2.50	2.50	2.60
Connellsville foundry, ovens	3.25	3.25	3.30	3.50
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	30.00	30.00	30.00	33.00
Sheet bars, open-hearth, Pitts.	30.00	30.00	30.00	33.00
Billets, open-hearth, Pittsburgh	30.00	30.00	30.00	33.00
Wire rods, Pittsburgh	37.00	36.00	35.00	38.00

	April 15, 1931	March 1931	Jan. 1931	April 1930
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.65	1.65	1.65	1.80
Steel bars, Chicago	1.80	1.60	1.60	1.85
Steel bars, Philadelphia	1.94	1.94	1.94	2.12
Iron bars, Chicago	1.80	1.70	1.70	1.95
Shapes, Pittsburgh	1.65	1.60	1.60	1.80
Shapes, Philadelphia	1.81	1.81	1.81	1.81
Shapes, Chicago	1.80	1.70	1.70	1.90
Tank plates, Pittsburgh	1.65	1.65	1.65	1.80
Tank plates, Philadelphia	1.80½	1.80½	1.80½	1.95
Tank plates, Chicago	1.80	1.70	1.70	1.90
Sheets, blue anl., No. 13, Pitts.	2.00	2.05	2.05	2.25
Sheets, black, No. 24, Pitts.	2.25	2.35	2.35	2.65
Sheets, gal., No. 24, Pittsburgh	2.85	2.90	2.90	3.30
Sheets, black, No. 24, Chicago	2.40	2.50	2.50	2.80
Sheets, blue anl., No. 13, Chicago	2.20	2.20	2.20	2.40
Sheets, galvanized, No. 24, Chi.	3.00	3.05	3.05	3.45
Plain wire, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh	1.90	1.90	1.90	2.25
Tin plate, per base box, Pitts.	5.00	5.00	5.00	5.25
SCRAP				
Heavy melting steel, Pitts.	12.25	12.90	13.00	16.05
Heavy melting steel, eastern Pa.	10.50	10.50	10.50	13.95
Heavy melting steel, Chicago	9.75	9.75	10.00	13.00
No. 1 wrought, eastern Pa.	11.00	11.00	13.25	15.75
No. 1 wrought, Chicago	9.00	9.00	9.50	13.30
Rails for rolling, Chicago	12.00	12.00	13.00	15.00

Sheets

New Business in Lighter Volume—Autobody Sold at 3.10c—Other Grades Are Easier

SHEET PRICES, PAGE 63

Pittsburgh—Sheet business holds to its recent dull rate, improvement lacking in requirements of principal consumers and incoming business being slightly smaller than during recent weeks. Operations now average little more than 40 per cent, against 45 a month ago. Prices remain unsettled. Black sheets usually are 2.25c, with 2.30c still applied on small lots. The 2.80c price on galvanized generally is limited to jobbers, up to 2.90c applying to consumers. Blue annealed sheets usually are 1.90c to 2.05c, although $1 a ton less is going on some business. Autobody sheets are 3.10c to 3.20c. Automotive orders are little changed but light, as also is demand from farm implement manufacturers. Sheet buying for electrical refrigerators and other electrical equipment is fair.

Philadelphia—Demand for sheets is sluggish. Galvanized are subject to occasional shading at 2.80c to 2.90c, Pittsburgh. Black are easy at 2.25c. Blue annealed are settling to 1.85c and 2.00c, $1 a ton under recent figures.

Buffalo—District sheet mills are operating at about 50 per cent of capacity. The market is featureless.

Youngstown, O.—New business in common grades has fallen off, resulting in slowing down operating rates. Important makers are soliciting orders for special sheets, as the making of common sheets is held to be unprofitable. There appears to be a satisfactory volume of automobile sheets flowing to mills but such mills are operating around 50 per cent. Indications now point to automotive production picking up in May, and in some instances into June. Improvement in buying by furniture makers has held fairly well. Quotations are unchanged at 2.25c, Pittsburgh, for common black; 1.90c to 2.05c for blue annealed; 3.20c for autobody, and 2.85c to 2.90c for galvanized.

Cleveland—The volume of sheet sales has tapered and the price situation in several instances is confused. Though black sheets here are 2.25c to 2.35c, in the Detroit district the Newton Steel Co. and Michigan Steel Corp. have named Monroe, Mich., and Ecorse, Mich., respectively, as basing points and prices equivalent to 2.15c, Pittsburgh, are named. Autobody sheets have been scaled down in that district to 3.10c, Pittsburgh. Demand for blue annealed sheets is light, and in absence of a test prices remain unchanged at 2.05c, Pittsburgh, for No. 13, and 1.90c for Nos. 9-10. Locally some makers are extending 2.25c on all new specifications for black, with some 2.35c business still available to those producers who have refused to go to the lower level.

Cincinnati—Sheet mills maintain production above 50 per cent. New business during the past week was slightly less than in the week preceding.

Chicago—Sheet specifications again are irregular. Mills are losing a few turns this week and will maintain 50 to 55 per cent operations. Business is nearly all carload or less, and consequently little shading of prices results. For nearby delivery, 2.45c, base, still is quoted for No. 24 black sheets.

St. Louis—Seasonal demand for sheets is beginning to assert itself, especially for blue annealed and black. Individual lots are small.

Birmingham, Ala. — Sheet mills continue to operate at 50 per cent.

Fred S. Morton, Mathews Mfg. Co., Worcester, Mass., has been elected president of the Worcester branch of the National Metal Trades association. Fred A. Ball, L. S. Starrett & Co., Athol, Mass., was named vice president, and William Arter, Arter Grinding Machine Co., Worcester, treasurer.

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

SHEET MILL BLACK, NO. 24

Pittsburgh, base	2.25c to 2.35c
Detroit, del.	2.41½c
Philadelphia, delivered	2.54c
Gary, Indiana Harbor	2.35c to 2.45c
Chicago, delivered	2.40c to 2.50c
Birmingham, base	2.50c
St. Louis, del.	2.70½c

TIN MILL BLACK, NO. 28

Pittsburgh, base	2.55c to 2.65c
Gary, base	2.65c to 2.75c

GALVANIZED NO. 24

Pittsburgh, base	2.80c to 2.90c
Philadelphia, delivered	3.09c to 3.19c
Chicago, delivered	3.00c to 3.05c
Gary, Indiana Harbor	2.95c to 3.00c
Birmingham, base	3.05c
St. Louis, del.	3.25½c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.00c to 2.05c
Chicago, district mills	2.15c
Chicago, delivered	2.20c
St. Louis, delivered	2.40½c
Philadelphia, delivered	2.29c
Birmingham	2.20c

BLUE ANNEALED SHEETS NO. 9-10

Pittsburgh, base	1.85c to 1.90c
Chicago, district mills	2.00c
Chicago, delivered	2.05c
Philadelphia, delivered	2.14c
St. Louis, delivered	2.25½c
Birmingham	2.05c to 2.10c

AUTOMOBILE NO. 20

Pittsburgh, base	3.10c to 3.20c

FURNITURE NO. 24

Pittsburgh, patent leveled..	3.50c

Tin and Terne Plate

Prices per 100 pound box Pittsburgh

Tin plate, coke base	$5.00

Gary, Ind., base 10 cents higher.

(Per pound)

Long ternes, 24, unassorted	3.25c

Wire Products

(To Jobbers-Merchant Trade)

F.o.b. Pittsburgh, Cleveland base
(Per 100 pound keg)

Standard wire nails	$1.90 and 2.00
Cement coated nails	1.90 and 2.00
Galvanized nails	3.90 and 4.00

(Per pound)

Polished staples	2.35c and 2.45c
Galvanized staples	2.60c and 2.70c
Barbed wire, gal.	2.55c and 2.65c
Annealed fence wire	2.35c and 2.45c
Galvanized wire	2.80c and 2.90c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c to 2.30c
Spring wire	3.20c to 3.30c
Wire, delivered Detroit	2.50c
Nails, delivered Detroit	$2.35

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind., Chicago, $1 over Pitts.-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

(Second-quarter asking prices $2 per ton above those levels, except fencing.)

Rivets

Struc. c.l., Pitts.-Cleve.	2.75c
Struc., c.l., Chicago	2.85c

**7/16-in., smaller, Pitts..70, 10 and 5 off
Chi., Cleve. .....70 to 70, 10 and 5 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Steel Plates

Base, Pittsburgh	1.65c to 1.70c
Philadelphia, del.	1.85½c to 1.90½c
New York, delivered	1.93c to 1.98c
Boston, delivered	2.05c to 2.10c
Chicago, base	1.70c to 1.80c
Cleveland, delivered	1.83½c to 1.88½c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham, base	1.80c to 1.85c
Coatesville, Pa., base	1.75c to 1.80c
Pacific Coast, c.i.f.	2.05c to 2.15c
St Louis, del	1.95½c

Structural Shapes

Base, Pittsburgh	1.65c to 1.70c
Philadelphia, del.	1.81c
New York, del.	1.90½c to 1.95½c
Boston, del.	2.03½c to 2.08½c
Chicago, base	1.70c to 1.80c
Cleveland, delivered	1.83½c to 1.88½c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham base	1.80c to 1.85c
Pacific Coast, c.i.f.	2.15c to 2.25c

Bars

SOFT STEEL

Base, Pittsburgh	1.65c to 1.70c
Chicago, base	1.70c to 1.80c
Birmingham base	1.80c to 1.85c
Lackawanna, N. Y., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.25c
Cleveland, base	1.65c to 1.70c
Philadelphia, del.	1.94c to 1.99c
New York, del.	1.98c to 2.03½c
Boston, del.	2.05c to 2.10c
Pittsburgh, cold finish	1.80c to 1.85c
Pittsburgh, forg. qual.	1.90c to 1.95c

RAIL STEEL

Chicago Heights	1.60c to 1.65c
Eastern mills	1.55c

IRON

Chicago, base	1.70c to 1.80c
New York, delivered	1.93c to 2.03c
Philadelphia, delivered	1.89c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pitts., billet cut lengths	1.90c to 2.00c
Stock lengths, mill	1.65c to 1.75c
Chi., billet	1.85c to 2.00c
Chi., rail steel	1.60c to 1.70c
Chi., rail steel, less carload	1.90c
Philadelphia, cut lengths..	2.19c
Cleveland, cut lengths	1.95c to 2.05c

Cold Finished Steel Bars and Shafting

Base, Pittsburgh, Chicago, Buffalo and Cleveland	2.10c
Shafting, turned and ground, mill	2.45c to 2.90c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel
Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot strip	19c	20.5c	23c	28c
Cold strip	28c	29.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to $6.75 off
Carloads, Chicago dist.	6.70 to 6.80 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	1.25-1.75 Ni.	1.05
2100	0.55	5100 .80 - 1.10	
2300	1.50	Cr.	0.45
2500	2.25	51.00 Cr.	
3100	0.55	spring	0.30
3200	1.35	6100 bars	1.20
3300	3.80	6100 Spring	0.95
3400	3.20	Cr., Ni., Van.	1.50
4100 .15 to .25		Carbon Van.	0.95
Mo.	0.50	9250 (flats)	0.25
4600 .20 to .30 Mo.		9250 (rds.,sq.)	0.50

Strip, Hoops Bands

Hot strip, to 6-in., Pitts.	1.65c
Hot strip 6 1/16 to 24-in. Pitts.	1.55c
Hot strip, bands 6 in. and under, Chicago	1.75c
Do. 6 1/16 to 24 in.	1.65c
Cooperage hoop, Pitts.	1.70c to 1.80c
Do, Chicago	2.00c to 2.10c
Cold rolled strip, Pitts., Cleve., 3 tons, over	2.25c
Worcester, 3 tons, over	2.40c to 2.50c

Rails, Track Material

Standard bess. and open hearth rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 28.00
Light rails, 25-45, mills	$34.00
Light rails, Chicago	$36.00
Angle bars, Chi. base	2.75c
Spikes, railroad, mills	2.70c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.70c
Spikes boat, barge, Pitts.	3.00c
Spikes, railroad, Chi.	2.80c
Track bolts, Pitts., steam roads	3.80c
Do. standard, jobbers	73 off list
Track bolts, Chicago	3.80c
Tie plate, mills	$39.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread	73 off

Rolled thread ⅝ x 6 and smaller take 10 per cent lower list.

Eagle list	73 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts	73 off

Tire bolts, 60, 10 and 10 off.

Stove bolts, 80, 10, 10, 5 off in pkgs.; 80, 10, 5, 2½ off in bulk.

Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished	73 off

HEXAGON CAP SCREWS

Milled	80-10-10-5 off
Upset 1 in. diam. and smaller	85-10 off

SQUARE HEAD SET SCREWS

Milled	80-5 off
Upset 1 in. and smaller	80-10-5 off
Upset, larger than 1 in.	80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l., Pittsburgh do, less carloads, 5 kegs or over, 2.65c to 2.75c; and less than 5 kegs	2.40c to 2.50c 2.80c to 2.90c
Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	1.90c

Bars

Specifications Are Light After Heavy Covering of First Quarter Tonnage—Prices Steady

BAR PRICES, PAGE 63

Chicago—In contrast with the brisk finished steel contract sales at the turn of the quarter, when buyers sought extended protection on the former price basis, the existing volume is light. Moderate spot sales of bars and other finished steel occur, but forward interest is lacking. As far as further increased orders are concerned, it is felt that the first half year now might be written off. Most current business is at 1.70c, base, but odd lot and mixed carload orders have been closed at 1.75c and 1.80c, Chicago. Bar mill production is down slightly to about 50 to 55 per cent, as one mill has been taken out in the last week. Road machinery orders are holding, while gains of 12 to 14 per cent are expected in automotive steel this month. Specifications of bar products are close to the average of this year.

New York — Steel bar demand shows little life, with prices 1.65c to 1.70c, Pittsburgh. Some leading sellers maintain that 1.70c is minimum on going business. Common iron bars are moving slowly at 1.60c to 1.70c.

Philadelphia—Steel bars continue at 1.65c to 1.70c, Pittsburgh, with the outside figure gaining strength. Trading continues light.

Pittsburgh—Specifications for steel bars are light, in a measure reflecting closing out of contracts the latter part of March. Shipments are fairly well sustained. Producers occasionally are receiving small spot lots at 1.70c, Pittsburgh, but there has been little opportunity to quote on large tonnages with some shipments still being made against 1.60c orders and 1.65c is fairly steady on quarterly contracts.

Youngstown, O.—Steel bar mill business continues in driblets but with a fair-sized backlog mills are able to operate around 45 to 50 per cent. Alloy steel bars continue to enjoy a fair demand from auto partsmakers. Common steel bars bring 1.65c, Pittsburgh.

Cleveland—Sales of merchant steel bars in most instances are being made at 1.70c, Cleveland, though recently a local mill in several cases has named 1.65c, at Toledo and several other outlying points. The market is quotable at 1.65c to 1.70c, Cleveland base, and it is encouraging to note the progress made in sales at $1 a ton up from the first quarter price. Little support is lent by any particular consuming group though the aggregate is moderately fair.

Cold-Finished Bar Specifying Slackens

Cold Finished Prices, Page 63

Pittsburgh — Shipments of cold-finished steel bars are fairly steady while specifications have declined slightly during the past week. Orders are in small lots and reflect uncertainty over the outlook in the automotive industry. The market continues 2.10c, Pittsburgh.

Cleveland—A decline in the volume of specifications for cold-finished steel bars has characterized the market this week. Shipments are fairly steady. The price of 2.10c is the going figure on everything not under contract coverage.

Electric Equipment Bought

Milwaukee—The navy department has accepted the bid of the Industrial Heating & Engineering Co., Milwaukee, for installation of a turbo-alternator and condensing equipment at the Great Lakes, Ill., naval training station at $17,000.

Plates

Specifications Slower — 7000 Tons Placed for Refinery Work —1.65c on Some New Contracts

PLATE PRICES, PAGE 63

Chicago—Tank plate orders for refinery work in the new East Texas fields totaled about 7000 tons in the past week, and about 3000 tons of tank plates are on inquiry from the oil fields, mainly Texas and the coast. Plate prices are 1.70c to 1.80c, Chicago. Plate shipments to Milwaukee for line pipe fabrication will be over 25,000 tons this month. Orders from small boiler makers and miscellaneous manufacturers are fair. Plate mill operations at 65 to 70 per cent show little change.

New York—Although subject to some shading, plates generally are 1.75c for carloads, with small lots at 1.80c, Coatesville, Pa., following an increase in specifications on first quarter contracts around the first of the month demand has been spotty. The New York Central Westside terminal order continues pending.

Philadelphia—Most of the current plate tonnage is moving at 1.75c, Coatesville, Pa., 1.80c applying to small lots. The next two weeks are expected to see the end of protection on several projects at 1.70c. Approximately 600 tons are required for the sumarine V-9, bids due April 16. A similar type is to be brought out later. The market outlook generally is dull.

Pittsburgh—Plate prices are receiving but little test, shipments still being made against specifications on first quarter contracts. The 1.65c price is applying on some new contracts while the 1.70c figure is largely nominal in the spot market. Featuring recent plate orders is one for ten dump scows requiring 3500 tons of plates and shapes placed by the American Dredging Co. Tank work continues quiet.

Cleveland—Orders for plates are slow, customers showing a more decided tendency to lag in specifying. The price of 1.65c to 1.70c, Pittsburgh, is maintained, and in some instances 1.70c has been applied to contracts, though the latter figure is more prevalent for spot orders. Carload sales have been made at 1.70c, and 1.60c has virtually disappeared. Gulf Refining Co. will purchase through Pittsburgh plates for 23 steel tanks to be erected here. These tanks will have a combined capacity of 8,000,000 gallons. Ship repair work is slack.

Birmingham, Ala.—A moderate amount of plate business has been booked. A Birmingham tank works has orders which warrant full operation and occasionally night schedules.

Contracts Placed

800 tons, plates and shapes, four barges for unstated buyer, to Jones & Laughlin Steel Corp., Pittsburgh.

Shipments of domestic pumps totaled 38,054 units in February against 31,273 in January, according to 38 makers' report to the department of commerce.

Railroads

Rail Mill Rates Steady—Great Northern Buys 500 Gondolas—Bethlehem Gets Rail Order

TRACK MATERIAL PRICES, PAGE 63

Chicago—A few miscellaneous car equipment orders have been placed, and General American Tank Car Corp. will build 300 refrigerator cars for leasing. Minneapolis & St. Louis has awarded 100 flat cars. About 2500 tons has been added to rail bookings through a small extra purchase by a western road and industrial rail business. Track fastenings orders were about 2500 tons, and substantial inquiries are out. Rail mill operations, at 50 to 55 per cent, are expected to continue without change for 60 to 90 days.

New York—Placing of more than 600 freight cars is outstanding in an otherwise drab car market. Fresh inquiry is at a standstill.

Denver—Rail mill of the Colorado Fuel & Iron Co., at Pueblo, Colo., has been closed due to light orders.

Philadelphia—Two hundred and thirty electric locomotives for the Pennsylvania railroad are likely to be awarded at once. It is estimated that 1000 tons of electrical sheets will be required for them.

Car Orders Placed

Great Northern, 500 50-ton gondolas, to Standard Steel Car Corp., Pittsburgh.

Minneapolis & St. Louis, 100 50-ton flat cars, to General American Car Co., Chicago; four gasoline-electric rail motor cars, to St. Louis Car Co., St. Louis.

Sheffield Farms, New York, 12 6000-gallon milk tank cars, to General American-Pfaudler Corp., Chicago.

Rail Orders Placed

Board of transportation, New York, 5500 tons, to Bethlehem Steel Co., Bethlehem, Pa.

Car Orders Pending

General American Tank Car Corp., 300 refrigerator cars for leasing.

Personals

(*Concluded from Page* 22)

designed steel castings and has operated both open-hearth and electric furnaces making plain steel, as well as both low and high alloys. For some time he has been living at Warren, O.

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R. W. Appleton, who as noted in STEEL of April 2 became purchasing agent of Morse Chain Co., is located at Ithaca, N. Y. R. W. Sowersby remains in charge of purchases at the company's Detroit plant.

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Walter H. Wiewel, affiliated with Timken Steel & Tube Co., Canton, O., for several years as manager of steel sales in New York, has been made sales manager with headquarters at Canton, O. He succeeds A. J. Sanford, resigned.

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F. H. Wilcox, vice president of Freyn Engineering Co., Chicago, returned March 29 from a trip to Europe and England taken in connection with his company's engineering projects abroad, including blast furnaces of Ford Motor Co. Ltd., Dagenham, England, and South African Iron & Steel Corp. Ltd., Pretoria, South Africa. Associated with the Freyn company in the work is Ashmore, Benson, Pease & Co. Ltd.

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William A. Haven, vice president of Arthur G. McKee & Co., Cleveland, engineers in blast furnace and steel plant construction, sailed last week for Russia where they are building a large steel plant. He will visit England and Germany en route.

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R. L. Ireland was recently elected a director of the M. A. Hanna Co., Cleveland. One more vacancy, the one caused by the death of C. A. Collins, vice president, remains to be filled.

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William J. Linn, export manager of Cleveland Pneumatic Tool Co., and Cleveland Rock Drill Co., Cleveland, affiliates, was recently made president of the Cleveland Export club.

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W. H. Hallstein, treasurer and director of purchases for Ilg Electric Ventilating Co., Chicago, was elected president of the Purchasing Agents' Association of Chicago, at its recent annual meeting.

Harry J. Reefe, Independent Pneumatic Tool Co., Chicago, was elected first vice president; James Shepherd, Sivyer Steel Casting Co., treasurer; and Frederick J. Heaslip, Fairbanks, Morse & Co., secretary.

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Irving L. Jones, formerly treasurer of International Heater Co., Utica, N. Y., has been elected president to succeed the late Frank E. Wheeler.

Beecher M. Crouse has been chosen a director to fill the vacancy on the board caused by the death of Mr. Wheeler.

Other officers elected are: Miss Mary J. Beggs, comptroller; Robert L. Griffiths, secretary-treasurer; and Harry A. Chester, assistant secretary and treasurer.

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B. F. Fairless, R. J. Wysor, W. B. Collins and J. Paul Moseley were added to the directorate of Republic Steel Corp., Youngstown, O., at the annual meeting April 8. Messrs. Fairless and Wysor are vice presidents of the corporation; Mr. Collins is assistant secretary, and Mr. Moseley is secretary-treasurer of Union Drawn Steel Co. division, Beaver Falls, Pa.

With the exception of C. F. Glore, banker, and Paul Llewellyn, chairman of Empire Steel Corp., Mansfield, O., retiring directors were re-elected. These include John S. Brookes Jr., Drury W. Cooper, Joseph O. Eaton, Tom M. Girdler, Edward B. Greene, Frederick J. Griffiths, John T. Harrington, Frank H. Hobson, George M. Humphrey, William G. Mather, Henry A. Raymond, J. F. Schoellkopf Jr., B. A. Tompkins. Myron A. Wick and Philip Wick.

Executive officers of Republic Steel Corp. are: T. M. Girdler, chairman and president, B. F. Fairless, R. J. Wysor and N. J. Clarke, vice presidents; J. U. Anderson, treasurer; and W. W. Hancock, secretary.

Chromite Ore in 1929

The status of chromite ore, principal source of chromium, for the year 1929, is discussed in a recent publication of the bureau of mines, department of commerce, Washington. The author is Lewis A. Smith and the discussion includes comment on chromite mining in the United States, imports, consumption, uses, prices and world aspects of the ore, for which an ever increasing demand is being felt.

Standards Data Published

A new compilation of data entitled, "Measurement Units and Standards," has been issued by the American Institute of Weights and Measures, 33 Rector street, New York, and a copy of the book may be obtained gratis by applying to the institute, William E. Bullock, secretary.

Structural Shapes

Both Inquiry and Award Eases in East, Public Work and Bridges Continuing Most Active—Awards Are Under 1931 Weekly Average —Pending Is 45,305 Tons

STRUCTURAL SHAPE PRICES, PAGE 63

New York—New inquiry and lettings have slumped. Public work and bridges continue to take the bulk of structural steel. While awards in this territory are running slightly ahead of last year, the outlook for continuance of this rate is not bright, with gradual closing of pending projects for the city, state and federal governments. Fabricated structural steel prices are unsteady, although plain material is firmer on new business. Fabricating shops are not doing better than 55 per cent as a rule.

Boston—Work begins April 20 on the Boston post office, McClintic-Marshall Corp., Bethlehem, Pa., having been awarded 2000 tons additional to the 8000 tons reported in STEEL Jan. 15. Springfield, Mass., post office, 850 tons, has been placed. Kittredge Bridge Co. took two bridges, one for 150 tons at Boothbay, Me., and one for 330 tons at Pembroke, N. H.

Philadelphia—While lacking the tonnage of recent weeks, structural orders are slightly more numerous with substantial projects under contemplation. United Engineers & Constructors, Philadelphia, are expected to inquire within 60 days for a large power plant at Burlington, N. J., involving several thousand tons, and a power plant addition, Kearny, N. J., taking 900, both for the Public Service Corp. of New Jersey. Shapes are holding at 1.75c, mill, on carloads.

Buffalo—Construction will proceed immediately with a lift bridge over the Buffalo river at Michigan avenue. Thirteen hundred tons of structural steel will be required. Bids will be taken about June 15.

Pittsburgh—Shape shipments lack improvement and are little changed from the rate of recent weeks. Inquiry for small lots is fairly active while large projects continue few. Prices still are not clearly defined, shipments still being made against business booked in first quarter.

Cleveland—Baltimore & Ohio railroad will build a warehouse in Cleveland taking approximately 185 tons of structural steel, plans released April 11. Mt. Vernon Bridge Co. took 253 tons for two plate girder spans for the Big Four railroad; G. L. Mesker & Co., Evansville, Ind., was awarded 333 tons for a seminary at St. Meinrad, Ind.; and the 1000 tons in the City National Bank building, Lansing, Mich., went to R. C. Mahon Co., Detroit. Locally, awards do not reach sizable proportions. John Carroll university is being withheld for a final list of changes. The Austin Co. took 150 tons in an airship dock at Jackson Heights, Long Island, N. Y. The market is 1.65c to 1.70c, Pittsburgh, on plain structural material.

Chicago—More structural work is being figured, but important active jobs are scarce. Plain structural material is 1.70c to 1.80c, Chicago. Fabricators are operating 40 to 45 per cent, largely on bridge and other public work. Fresh projects include the $23,000,000 Chicago post office, the $15,000,000 unit for the Field Estate buildings, and 6000 tons for the outer drive bridge. Chicago board of education has a school building program of close to $20,000,000 for this year. University of Chicago building will be $8,500,000.

Birmingham, Ala.—Bids are being prepared on several projects. Ingalls Iron Works is fabricating 100 tons for S. H. Kress store, Billings, Mont., shipment all by rail.

Contracts Placed

2000 tons, Boston postoffice, additional to 8000-ton award in STEEL of Jan. 15, to McClintic-Marshall Corp., Bethlehem, Pa.

2000 tons, county building, White Plains, N. Y., Westchester county, to Hinkle Iron Works, New York; William L. Crow Construction Co., general contractor.

1600 tons, bridge, University avenue, Philadelphia, to McClintic-Marshall Corp., Bethlehem, Pa.

1467 tons, Connecticut avenue bridge, Washington, to McClintic-Marshall Corp., Bethlehem, Pa.

1020 tons, state hospital, Brentwood, L. I., to B. Schact & Sons, Bronx, N. Y.

1000 tons, City National Bank building, Lansing, Mich., to R. C. Mahon Co., Detroit.

1000 tons, office building, Galveston, Tex., to Houston Structural Steel Co., Houston, Tex.

1000 tons, post office, Springfield, Mass., to Palmer Steel Co., Springfield, Mass.

900 tons, floor of Walnut street bridge, to McClintic-Marshall Corp., Bethlehem, Pa.

650 tons, ore dock for Soo Line, Marquette, Mich., to McClintic-Marshall Corp., Bethlehem, Pa.

600 tons, addition to St. Patrick's college building, Ottawa, Ont., to Dominion Bridge Co., Quebec, Que.

537 tons, Iowa state bridge, to Clinton Bridge Works, Clinton, Iowa.

500 tons, brass mill, Ansonia, Conn., to American Bridge Co., Pittsburgh.

410 tons, Pennsylvania railroad bridge, Dayton, O., to unstated fabricator.

340 tons, three bridges, Ritchie county, W. Va., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

333 tons, seminary, St. Meinrad, Ind., to G. L. Mesker & Co., Evansville, Ind.

330 tons, state bridge, Pembroke, N. H., to Kittredge Bridge Co., Concord, N. H.

325 tons, salt chemical plant, the Texas Co., West Tulsa, Okla., to Patterson Steel Co., Tulsa.

280 tons, bridges for Virginia & Western railroad, to Virginia Bridge & Iron Co., Roanoke, Va.

253 tons, two plate girder spans for Big Four railroad, to Mt. Vernon Bridge Co., Mt. Vernon, O.

250 tons, bridge, Johnson county, Wyo., to unstated company.

250 tons, Byberry hospital, Philadelphia, to Bethlehem Fabricators Inc., Bethlehem, Pa.

250 tons, Marmet lock, Great Kanawha river, for United States engineers, Huntington, W. Va., district, to Wheeling Structural Steel Co., Wheeling, W. Va., through General Contracting Co., Pittsburgh, general contractor.

227 tons, nurses homes, general hospital, Wilkes Barre, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.

210 tons, additional for Rosenwald museum, Jackson Park, Chicago, to Midland Structural Steel Co., Chicago.

200 tons, stores and office building, Jamaica avenue and 164th street, Jamaica, N. Y., to Levering & Garrigues Co., New York; J. J. Caye Construction Co., general contractor.

200 tons, Pennsylvania railroad bridge, Swarthmore, Pa., to Shoemaker Bridge Co., Pottstown, Pa.

200 tons, addition to Masonite Mfg. Co. plant, Laurel, Miss., to Ingalls Iron Works Co., Birmingham, Ala.

198 tons, additional material for Fine Arts building, Chicago, to McClintic-Marshall Corp., Bethlehem, Pa.

185 tons, Fourth Church of Christ, Scientist, New York, to Bethlehem Fabricators Inc., Bethlehem, Pa.

175 tons, high school, Delaware county, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.

160 tons, building, Merrimac Chemical Co., Everett, Mass., to Boston Structural Co., Boston.

150 tons, bridge, Boothbay, Me., to Kitt-

Awards Compared

	Tons
Awards this week	20,395
Awards last week	45,220
Awards two weeks ago	143,904
Award this week in 1930	42,885
Av. weekly awards, 1930	35,242
Av. weekly awards, 1931	44,418
Av. weekly awards, March	64,860
Total award to date, 1930	517,670
Total awards to date, 1931	710,682

redge Bridge Co., Concord, N. H.
150 tons, addition and alteration, Y. W. C. A., 137th street, New York, to Harris Structural Steel Co., New York.
150 tons, airship hangar, for Goodyear Zeppelin Corp., Jackson Heights, Queens, N. Y., to the Austin Co., Cleveland.
135 tons, buildings, Barret Co., Philadelphia, to Bethlehem Fabricators Inc., Bethlehem, Pa.
135 tons, law building, University of Virginia, Richmond, Va., to Richmond Structural Steel Co., Richmond.
125 tons, two steel spans in Alaska and one in Clallam county, Wash., to Wallace Bridge & Structural Steel Co., Seattle.
100 tons, repairs to Reading bridge, Philadelphia, to Belmont Iron Works, Philadelphia.
100 tons, store building for S. H. Kress, Billings, Mont., to Ingalls Iron Works Co., Birmingham, Ala.
100 tons, apartment, Sterling Place, Brooklyn, N. Y., to Claremont Iron Works, Bronx, N. Y.
100 tons or more, apartment, Waldo avenue and 242nd street, Bronx, N. Y., to Confield Iron Works.
100 tons, alterations, Railway Express Agency building, Chicago, to Vierling Steel Works, Chicago.

Contracts Pending

9000 tons, Willseye hospital, Philadelphia.
6000 tons, Market street subway, Philadelphia; Joffoda & Mark, low.
3500 tons, supreme court building, Philadelphia; John T. Windrim, architect.
3000 tons, court house, Reading, Pa.; Bids April 28.
2500 tons, Temple of Arts, Parkway, Philadelphia.
2500 tons, Franklin institute, Philadelphia.
2500 tons, Standard Oil Co. building, Washington; new bids asked.
2000 tons, auditorium, St. Paul.
2000 tons, county bridge, Reading, Pa.
1500 tons, building, Fifteenth and Spruce streets, Philadelphia.
1500 tons, New York Central railroad, cold storage warehouse, New York.
1500 tons, high level bridge, Hamilton, Ont., for city council.
1300 tons, Michigan avenue bridge, Buffalo; bids about June 15.
1000 tons, armory buildings, Kingston and Newburgh, N. Y.
1000 tons, chapel, Girard college, Philadelphia; specifications out in 60 days.
1000 tons, state bridge, Ouachita river, Louisiana; bids April 27.
750 tons, state bridge, Mermentain river, Louisiana; bids April 28.
750 tons, auto sales building, Wilshire boulevard, Los Angeles; bids being received.
700 tons, office building, Los Angeles, Calif.
600 tons, Tufts college unit, Medford, Mass.
580 tons, state bridge over Deal lake, Monmouth county, N. J.; bids April 27.
500 tons, office building, Syracuse, Lighting Co., Syracuse, N. Y., Bley & Leyman, architects, Buffalo.
500 tons, state highway bridge, New Jersey.
545 tons, state bridge, Fort Lee, N. J.; bids April 20.
450 tons, New Trier high school, Winnetka, Ill.
400 tons, Masonic building, Baltimore, redesigned.
400 tons, high school, Spokane.
400 tons, state bridge, New York.
350 tons, Greyhound bus line building, Philadelphia.
303 tons, bridge over Ell river, Mendocino county, Calif.; bids April 29.
200 tons, science building, Century of Progress exposition, Chicago; bids in on general contract.
198 tons, bridge over Clear Creek, Shasta county, Calif.; bids April 29.
185 tons, warehouse for Baltimore & Ohio railroad, Cleveland.
175 tons, three bridges, New Jersey; bids April 13.
110 ton, two 80-foot plate girder spans, Green county, Wis.; bids close April 21 with state highway commission.
Unstated tonnage, power plants, one at Burlington, N. J., and addition at Kearny, N. J., for Public Service Corp. of New Jersey; United Engineers & Constructors, Philadelphia, expect to inquire for bids within next 60 days.
Unstated, 22-story Medical Arts building, Milwaukee; Russell Barr Williamson, 707 North Broadway, Milwaukee, architect.

Concrete Bars

Pending Work Largely Public but Awards Are in Small Aggregate— Awards Postponed in West—Prices Display Unsteadiness in East— Total Placed Only 1948 Tons

REINFORCING BAR PRICES, PAGE 63

Chicago—Indefinite postponement of a number of building projects, after figures on reinforcing steel had been tabulated, has thwarted much of the promised activity in this market for the next few weeks. Included in deferred projects is the 1000-ton Railton warehouse in Chicago, and the 800-ton Swayne apartment. About 4000 tons of bars for Illinois road work is being distributed among fabricators, and about 45 miles additional has been awarded to contractors. Rail steel bars for road and bridge work now are being quoted 1.65c to 1.75c.

Boston—About 150 tons of bars were placed in the past week, all for small projects, which seem to be showing some pick up.

New York—Concrete reinforcing bar prices continue weak, shading prevailing on large lots especially. Pending tonnage is largely confined to public work and bridges. Road mesh is active with prices fairly steady. Several hundred tons are up for Connecticut bridges and highways.

Philadelphia—Delay attends the placing of 8400 tons of reinforcing bars for the Pennsylvania railroad, reported due to a downward revision of $1 a ton by one of the bidders. Usual going price is 1.60c to 1.65c, Pittsburgh. Miscellaneous trading is light.

Pittsburgh—Orders and inquiry for small lots of reinforcing bars are expanding. Large tonnages usually are lacking in this district while total incoming business to mills is well sustained. Prices tend toward easiness, usually being 1.65c for stock lengths.

Cleveland—Road mesh work is becoming slightly more active. Prices are fairly well maintained on reinforcing bars at 1.70c, Cleveland base. Local award is slow developing, steel in the Huron road hospital and municipal bridge at Akron, O., as well as the 135-ton culvert job at Cedar Point, O., still being deferred. No additional concrete bar tonnage is reported to be involved in the fourth subsidiary contract awarded Lowensohn Construction Co. on the Central-Lorain bridge, where cofferdams and concrete are to be substituted for piling.

Birmingham, Ala.—Manufacturers of reinforcing concrete bars report prospects bright with operations now unchanged for four weeks at 60 per cent of capacity.

Awards Compared

	Tons
Awards this week	1,948
Awards last week	6,356
Awards two weeks ago	10,870
Awards this week in 1930	9,599
Av. weekly awards, 1930	6,990
Av. weekly awards, 1931	7,269
Av. weekly awards, March	12,367
Total awards to date, 1930	107,672
Total awards to date, 1931	116,302

Contracts Placed

600 tons, Veterans Hospital, Waco, Tex., to Laclede Steel Co., St. Louis.
248 tons, highway work, San Diego county, Calif., to unstated company.
200 tons, laboratory, California Institute of Technology, Pasadena, Calif., to unstated company.
200 tons, Illinois road work, to Calumet Steel Co., Chicago.
200 tons, Illinois road work, to Concrete Engineering Co., Chicago.
100 tons, filtration plant, Grand Island, Nebr., to Laclede Steel Co., St. Louis.
100 tons, addition to United States

(*Concluded on Page* 71)

Strip

Fair Volume of Buying Is Done —Total Close to March Volume —Prices Generally Steady

STRIP PRICES, PAGE 63

Pittsburgh—Little further decline is noted in specifications for strip steel. Business so far in April is slightly below the comparable March volume, and continued hesitancy is noted in orders from the automotive industry. Prices are fairly steady at 1.55c and 1.65c for the two widths of hot strip and 2.25c for cold-rolled strip. Mill operations are slightly lower at 45 to 50 per cent for hot mills with cold strip production around 25 per cent.

New York—Strip demand continues light, with hot-rolled holding 1.55c, Pittsburgh, for wide, and 1.65c, for narrow. Cold-rolled strip is 2.25c, Pittsburgh.

Approximately 1000 tons of pickled hot strip for the Metropolitan Square-Radio City development has been awarded to unnamed mills.

Philadelphia—Hot-rolled strip is dull and unchanged at 1.55c, Pittsburgh, for wide and 1.65c, Pittsburgh, for narrow. Cold-rolled is 2.25c, Pittsburgh.

Youngstown, O.—While a fair volume of hot and cold-rolled strip specifications continues to come to district mills, it is showing signs of dwindling farther this week. Non-integrated strip mills are not taking so much hot-rolled strip as formerly. Competition is becoming keener with some makers offering secret rebates in the hope of obtaining desirable customers. In the main, however, quotations are unchanged on both hot and cold-rolled strip.

Cleveland—Sales of both hot and cold-rolled strip have been slightly encouraging recently. There has been sustained support from automotive and allied trades and several motor lamp manufacturers have expressed intention of keeping to present production schedules for the balance of April and May. The 2.25c, Cleveland and Pittsburgh, price is the going figure on cold and 1.55c and 1.65c, Pittsburgh, for wide and narrow, respectively, on hot-rolled.

Warehouse Gains in April Being Sustained

Warehouse Prices, Page 85

Chicago—Gains in warehouse sales of the last week in March and the first week in April are being held, and indications are noted of a mild upturn.

New York — Warehouse buying continues to hold its recent slight gains due largely to increases in light structurals. Prices are steadier.

Boston—In the past week a slight pickup has been noted in small projects.

Philadelphia — Trading is quiet, comparable to the rate through March. Prices are unchanged.

Buffalo—No material change is shown in warehouse demand. The opening of navigation has stimulated operations in local shipyards.

Pittsburgh—Sales are slow and with few exceptions little changed since March. Roofing sheets are moving slightly better. Sheet prices are easier.

Detroit—The number of orders has increased materially over the past few days. More miscellaneous small construction projects are being started. April should show increase over March.

Cincinnati—Warehouse volume remains little changed. One interest has installed equipment to handle concrete bar demand. Prices are unchanged.

Cleveland—Modest demand continues without improvement. Although indications point to price weakness in some items, there have been no announced reductions. Most quotations are reasonably firm.

St. Louis—Reports of iron and steel warehousemen reflect spotty conditions since the first of April. Generally there is betterment in demand for goods for distribution in the rural areas.

Operations' Loss This Week Insignificant

Youngstown, O.—Steel plant operations in the Mahoning valley this week declined to 44 per cent of capacity, compared with 45 per cent last week. Open-hearth steel melting rate for independents is at approximately 40 per cent of capacity, with Carnegie Steel Co. activity in this respect scheduled to be somewhat above that figure. Republic Steel rate again is at 50 per cent while Youngstown Sheet & Tube Co. operations are estimated at slightly less than 35 per cent.

Philadelphia—Eastern ingot operations are at 47 per cent, down one point from last week. A leading interest has ingot production 51 per cent engaged.

Buffalo—District steelworks are up three points to 49 per cent this week.

Pittsburgh—Ingot output is approximately two points lower this week at 50 per cent. A leading interest has blown out a blast furnace, leaving 21 of 54 active.

Cleveland—Ingot operations have tapered slightly with the taking off of an additional open hearth and for the district are now at about 56 per cent. Nineteen of 34 furnaces are pouring.

Chicago—Both ingot and steelworks blast furnace activity remains unchanged. Ingot output is 55 per cent. Finishing mills have fluctuated but net operations are virtually the same as a week ago. The leading interest has a blast furnace banked at Gary, in readiness. Active blast furnaces number 16 of 36.

Birmingham, Ala.—Sixteen open-hearth furnaces continue in production with output unchanged at 65 per cent. Apprehension as to lagging conditions in sheets and plates is allayed to some extent.

Bolt, Nut, Rivet Buying Better but Below Normal

Bolts, Nuts, Rivets Prices, Page 63

Pittsburgh — Specifications for bolts, nuts and rivets are fairly steady and slightly heavier than a month ago. All consumers are buying in small lots for prompt needs. Requirements of jobbers and railroads continue seasonally light. Recent price unsettlement in the eastern market as the result of foreign competition has not been reflected in other districts and the market remains fairly steady at 73 off for bolts and nuts and 2.75c, Pittsburgh, for large rivets.

Cleveland—Bolt and nut makers have been specifying more freely than usual for rods and plant operations have shown an increase. March was the best month in point of orders since June, 1930. A leading motor company in the Detroit district has issued a large specification which may bring April 10 to 15 per cent ahead of March for local plants. Price continues 73 off list.

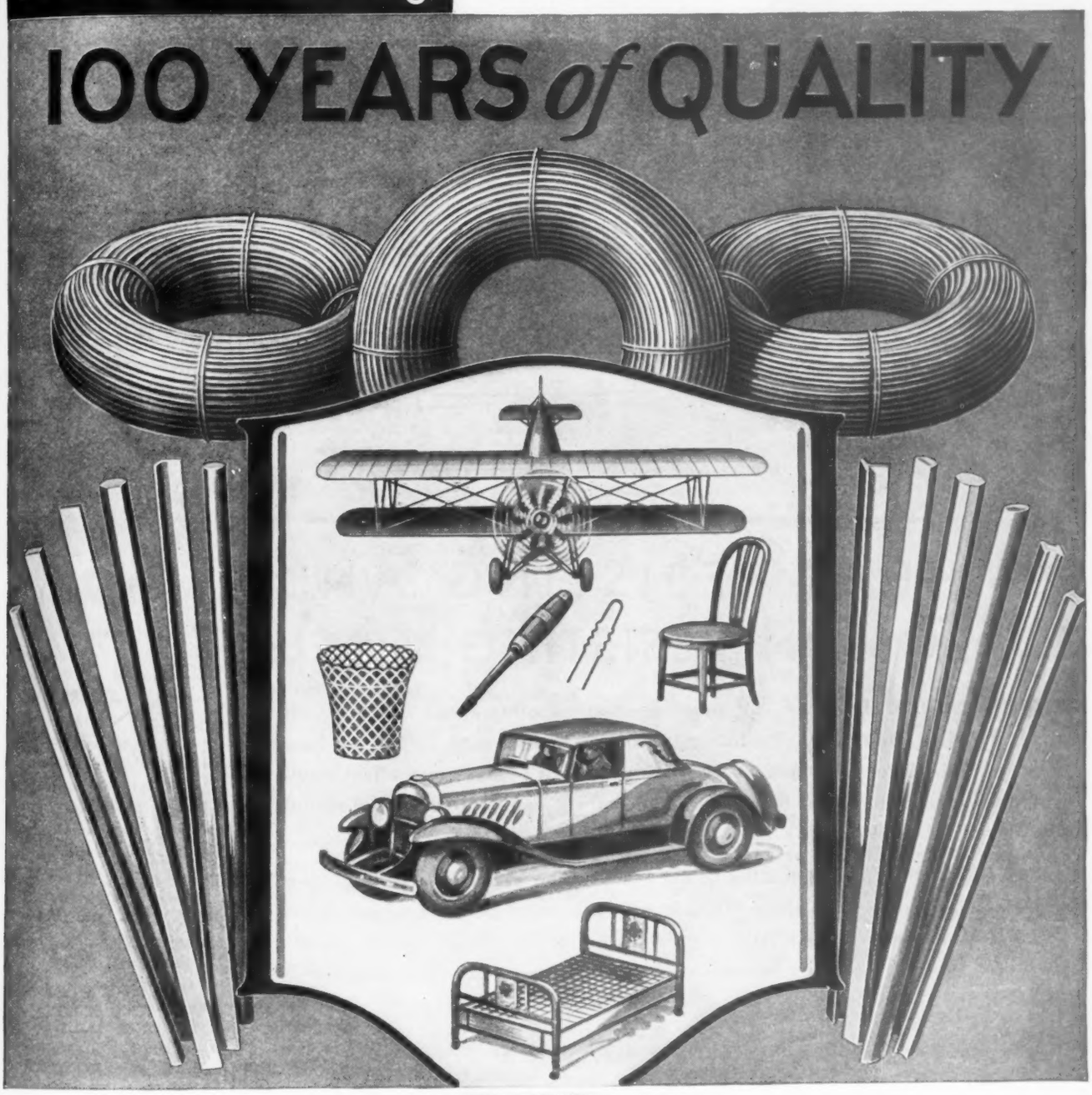
Chicago—Automotive orders may be able to maintain nut, bolt and rivet business at the volume of the last 30 days, although other consuming lines are dropping off. Discounts on bolts and nuts are maintained at 73 off.

American QUALITY Steel & Wire Company

WIRE for Manufacturing

ONE HUNDRED YEARS of wire making experience is back of American Steel & Wire Company products—experience that will solve your most vexing problems quickly and efficiently.

When you require round, flat, square, octagon or other shapes of wire—communicate with us. Prompt delivery and complete engineering service are yours to command.



1831 COMMEMORATING 100 YEARS of PROGRESS IN WIRE MAKING 1931

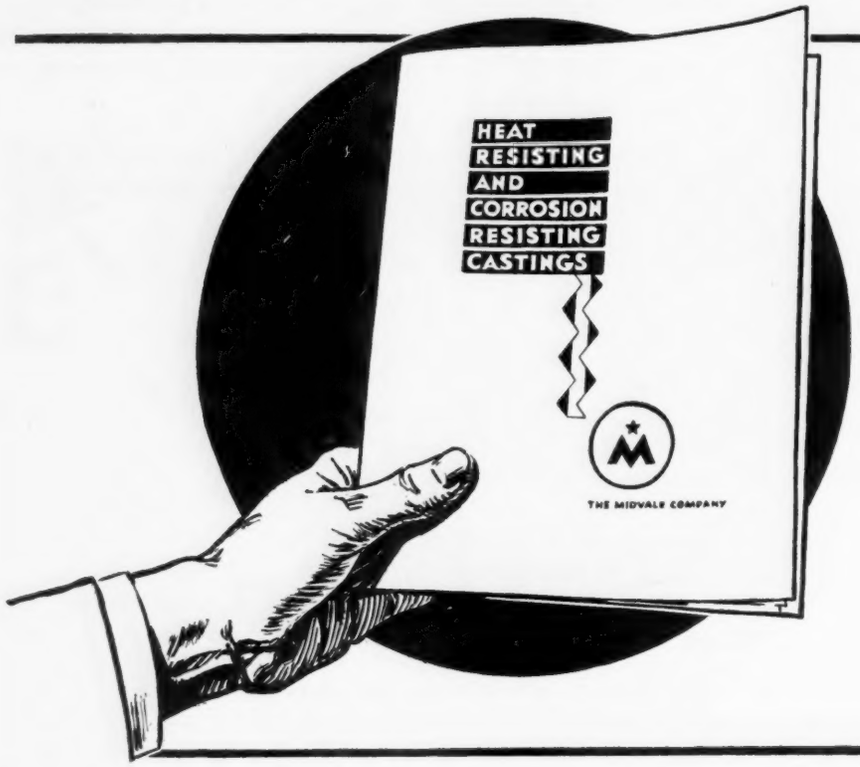
AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago — SUBSIDIARY OF UNITED STATES STEEL CORPORATION — And All Principal Cities

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

Export Distributors: United States Steel Products Company, New York

HAVE YOU THIS NEW BROCHURE



ON HEAT RESISTING AND CORROSION RESISTING STEEL

THE LAST WORD has still to be written on alloy steels for heat and corrosion resistance. Probably it will be many years before we have developed their full possibilities. Conditions of operation so affect standards of composition for certain temperature ranges that rule-of-thumb methods are impossible.

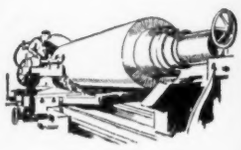
However, 63 years of steel making and a rich pioneer experience in the manufacture of alloy steels have given Midvale two definite advantages to you. First, we are in position to advise you on specifications for almost every present condition. Second, we are conservative because we have accurate knowledge. Midvale makes no claims that have not been substantiated in actual operation.

This booklet will be helpful in considering problems that exist today. If you wish a copy, write The Midvale Company at its nearest office: Philadelphia, New York, Washington, Pittsburgh, Cleveland, Chicago or San Francisco.

MIDVALE

FORGED, HARDENED AND GROUND ROLLS

Among manufacturers of cold, rolled metals Midvale rolls have proved their excellence. The high degree of finish imparted to the products rolled and the long life of the rolls themselves are basic reasons for Midvale preference.



TOOL STEEL

Midvale does not follow the "tonnage" method of tool steel production. Midvale charges with cold metal. Lets the ingots cool, to permit inspection for faults. Carefully chips out any cracks. Reheats ingots and reduces to billet size. Sand-blasts the scale. Again inspects and chips when necessary. Reheats and rolls to finished size. This is the only method by which tool steel of Midvale quality can be produced.

Concrete Bars

(*Concluded from Page* 67)

Veterans hospital, New Orleans, to Laclede Steel Co., St. Louis.

100 tons, miscellaneous for Puget Sound navy yard, Washington, to Pacific Coast Steel Corp., Seattle.

100 tons, school, Evanston, Ill., to Olney J. Dean & Co., Chicago.

100 tons, Illinois highway work, to Olney J. Dean & Co., Chicago.

Contracts Pending

1100 tons, grain elevator for Chicago Elevator Properties Inc., 107th street and Calumet river, Chicago; general contract to James Stewart Corp.

254 tons, highway work in San Mateo county, Calif.; bids received.

150 tons, telephone building, Providence, R. I.

150 tons, telephone building, Lynn, Mass.

123 tons, highway work, Santa Barbara county, Calif.; bids received.

108 tons, bridge over Ell river, Mendocino county, Calif.; bids April 29.

Obituaries

(*Concluded from Page* 23)

home in Evanston, Ill. During the war he was captain in the construction division, quartermaster corps. Mr. Kirkland developed the pneumatic placing of concrete in large tunnels.

□ □ □

Byron T. Van Camp, 49, head of the Van Camp Stove Co., Cincinnati, died in an automobile accident near Richmond, Ind., March 28.

□ □ □

Charles W. Cowherd, 65, an employe of the Cockshutt Plow Co. Ltd., Brantford, Ont., for 49 years and superintendent for more than 30 years, died there last week.

□ □ □

Franklin K. Irwin, 71, a retired mechanical engineer formerly connected with the Philadelphia office of the Combustion Engineering Corp., New York, died April 6 at Ardmore, Pa.

□ □ □

Dr. E. H. Rothert, who for 30 years has been working on a process of reducing magnetite iron ore direct to steel, died April 2 at his home in Seattle. He is said to have recently perfected his process.

□ □ □

Daniel H. Deyoe, 55, with General Electric Co., Schenectady, N. Y., since 1898 and identified with its industrial engineering department since 1906, died April 11. He was active in electric arc welding for many years.

□ □ □

W. S. Robertson, 70, who became associated with Combustion Engineering Corp., New York, in 1912, died March 31 at Newark, N. J. He was active in sales work as special sales representative of the company in northern New Jersey and eastern Pennsylvania at the time of his death.

□ □ □

Francis Kernan, 74, former president of the Syracuse Stove Co., Syracuse, N. Y., died April 8.

□ □ □

Abraham Weber, 56, prominent in Buffalo metal industries for the past 17 years, died there March 20. He was one of several who purchased the Buffalo & Susquehanna railroad in 1914 and sold it as old material. Later he held large interests in the Titanium Bronze Co., Giant Truck Co., King Motor Car Co., and other corporations.

Recommends Uniform Data on Employment

The Connecticut state emergency committee on employment, of which James W. Hook, president, Geometric Tool Co., New Haven, is chairman, has submitted a report to the governor summarizing its studies and suggesting methods for relieving unemployment.

It recommends a comprehensive uniform plan for employers to follow to collate information so that trends of employment, hours and wages in identical industries over a continuing period may be available in the future. The data would be dated from October 1929. The committee recommends speedy adoption of the plan, fearing that if it is delayed "both employers and employes will approach the next depression unprepared."

Less Manganese at Suez

Washington—A large decrease in the amount of manganese shipped through the Suez canal occurred during 1930, shipments destined for the United States showing an exceptionally heavy drop, according to Consul Horace Remillard, at Port Said. In 1930 there passed through Suez canal 39 shipments of manganese ore totaling 252,657, compared with 65 shipments of 405,485 tons in 1929.

New Standard on Tools

Washington—The department of commerce is distributing the second revision of the simplified standard practice on forged tools, adopted at a conference at Pittsburgh, Feb. 17. The effective date of this second revision is July 1.

Pipe

Inquiry Leads Slight Improvement but Buying Still Is Slow to Close

PIPE PRICES, PAGE 85

New York—R. D. Wood & Co., Florence, N. J., was low on approximately 1400 tons of 6 and 12-inch cast pipe for the borough of Richmond, Staten Island. This closes buying for New York city first half yard stocks. A. G. Bancker & Co., Manhasset, Long Island, has the general contract for approximately 11 miles of 6 and 8-inch cast pipe for Greenlawn. Cast pipe prices are easy, awards going well under $34, eastern foundry. Utilities are buying little cast pipe and fresh inquiry has declined.

Boston—Approximately 1500 tons were awarded in the past week, Warren Foundry & Pipe Co. getting the majority of the awards.

Philadelphia—Pennsylvania Power & Light Co., Harrisburg, Pa., is figuring on 60 miles of 16-inch steel pipe and 16 miles of 6⅝-inch pipe. Pennsylvania state investigation of public utilities is said to be deferring considerable work of various companies.

Thirty-five thousand tons of 18 and 24-inch steel pipe are required for the last section of the line from the Texas panhandle to Chicago. The last section is 155 miles long. Ford, Bacon & Davis, New York, are engineers.

Pittsburgh—Improvement in the pipe market is confined mostly to inquiry, the gain in orders over the past 30 days having been slight. Inquiry is fairly well diversified but closing on such tonnage is slow. Expansion in standard pipe demand is looked for over coming months but activity in line pipe continues disappointing. Oil country goods demand is slow and business so far this month in mechanical tubing and locomotive and boiler tubes is less than in March.

Cleveland—Detroit has closed on 2400 tons of 12-inch cast on a linear foot basis, contract going to American Cast Iron Pipe Co., Birmingham, Ala.

Chicago — Numerous carload to

SHARON COLD ROLLED STRIP STEEL

FOR ELECTRICAL MANUFACTURING

The quality of an electrical appliance is determined by the grade of materials used in its manufacture.

Sharon Cold Rolled Strips are free from seams, slivers and excess camber. They are rolled from high grade Open Hearth steels, close to width and gauge and with a high grade finish suitable for plating.

Our Cold Rolling department is managed by experts with long experience in the art of Cold Rolling. They are men, who know the needs of the electrical industry.

For a better product—USE SHARON COLD ROLLED STRIP STEELS.

Save with Steel

SHARON STEEL HOOP COMPANY

SHARON ▲▼▲▼▲▼▲▼▲▼ PENNSYLVANIA

two-carload orders and inquiries for cast pressure pipe are noted in Wisconsin and Michigan, but Illinois business is light. Further municipal programs are awaiting readjustment after spring elections. Low bid for the 535 tons of 20-inch cast pipe for Chicago was about $42, delivered.

Birmingham, Ala. — Miscellaneous orders maintain a steady backlog. Production continues between 65 to 70 per cent and shipments are steady. The Midwest holds out promise on considerable tonnage next month.

Cast Pipe Placed

10,000 feet, 6 and 12-inch, Revere, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

3500 lineal feet, 4-inch, for Viroqua, Wis., to Central Foundry Co., Chicago.

3000 lineal feet, for Two Rivers, Wis., to Alabama Pipe Co., Birmingham, Ala.

2400 tons, 12-inch for Detroit, to American Cast Iron Pipe Co., Birmingham, Ala., on linear foot basis.

470 tons, 6 and 12-inch, Malden, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

365 tons, 4 and 10-inch, Arlington, Mass., to R. D. Wood & Co., Philadelphia.

250 tons, 6 and 12-inch, Watertown, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

200 tons, large size pipe for Milwaukee, to George T. Fritz Foundry & Machine Co., St. Louis.

175 tons, 6-inch monocast, for Camp Murray and Fort Lewis, Wash., to American Cast Iron Pipe Co., Birmingham, Ala.

120 tons, 6 and 8-inch, Somerset, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

100 tons, various sizes, Wakefield, Mass., to United States Pipe & Foundry Co., Burlington, N. J.

100 tons, 6 and 8-inch, Andover, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

100 tons, 10-inch class 150, for Lynden, Wash., to United States Pipe & Foundry Co., Burlington, N. Y.

Cast Pipe Pending

2896 tons, 6 and 12-inch class B, Los Angeles; bids April 16.

2725 tons, 16 to 24-inch class B, Los Angeles; bids received.

535 tons, 20-inch, for Chicago, Glamorgan Pipe & Foundry Co., Birmingham, Ala., low bidder at about $42, delivered.

413 tons, 20-inch class B, sewer section No. 1, San Pedro, Calif.; bids May 12.

150 tons, 24-inch, Passaic Valley water commission, Paterson, N. J.; April 14.

100 tons, various sizes, Cambridge, Mass.; bids closed April 13.

100 tons, 6, 10 and 12-inch, Brookline, Mass.; Warren Foundry & Pipe Co.; Phillipsburg, N. J.

Steel Pipe Pending

35,000 tons, 18 and 24-inch, 155-mile section from Texas panhandle to Chicago; Ford, Bacon & Davis, New York, engineers.

Unstated tonnage, 60 miles 16-inch and 16 miles 6⅝-inch, for Pennsylvania Power & Light Co., Harrisburg, Pa.

Wire

Light Buying Affords Little Test of Advanced Prices—Cut Nails Are Advanced $2 Per Ton

WIRE PRICES, PAGE 63

Chicago—Fencing wire shipments lead in activity and manufacturers' wire deliveries this month are ahead of March. Jobbers are ordering cautiously. Little buying is noted, and the newly announced prices are untested. Consumption of nails has been gaining moderately with increases in residential building.

Worcester, Mass.—April production is showing little change from March, although here and there are indications that output is a trifle under last month's figures. Prices are unchanged.

Pittsburgh—Wire producers have had little opportunity to test the higher prices announced several weeks ago. Buying is light following fairly heavy specifying in closing out first quarter contracts and a thorough test of prices is not looked for until late this month. Shipments against recent specifications are holding up better than was anticipated. Producers usually quote $2 a keg to jobbers for wire nails, 2.30c for plain wire and $37 for wire rods. Demand from agricultural districts is fair and improvement is looked for with more open weather. Producers of cut nails have advanced prices $2 a ton to 2.50c, Pittsburgh, for carload lots with the usual differentials on small orders.

Cleveland—Several scattered small lots of nails have been sold at $2 a keg, insufficient to test the market, but wire has yet to receive any test at 2.30c. Though several sellers have quoted the latter price, the 2.20c price is the only one current. Producers have extended first quarter prices on second quarter contracts, thus permitting contract customers to specify enough for second quarter. Bolt and nut makers have bought rods in increasing volume and $37 a ton, Pittsburgh, is claimed to be the going market, though material is being billed at less. No increase is to be noted in the movement of country goods and fencing, with rural districts extremely slow in buying.

Tin Plate Production Continues Over 80 Per Cent

Tin Plate Prices, Page 63

Pittsburgh—Tin plate activity is steady. Operations continue slightly better than 80 per cent while specifications are unchanged in volume but still fairly active. The outlook for vegetable packs is indefinite this early in the season, although recent improvement in weather conditions is a favorable factor. Tin plate continues $5 per base box.

New York—Domestic tin plate specifications continue good. The leading seller is reported to have closed on 60,000 boxes for Italy.

Semifinished Prices Reported Shaded $1 to $2

Semifinished Prices, Page 74

Pittsburgh—Little activity is noted in contracting for semifinished steel. Demands usually are filled by small orders for early needs. Shipments reflect lighter operations of sheet and strip mills although the total movement varies little from the rate a month ago. Some pressure is being brought by consumers against prices, with producers usually quoting $30 for rerolling billets, sheet bars and slabs. Occasional reports of sales at $1 to $2 less are heard. Forging billets are quoted $36 and wire rods $37.

Philadelphia—Demand for billets is quiet and prices are untested at $30, Pittsburgh, for rerolling, and $35 for forging quality.

Youngstown, O.—Sheet bars, billets and slabs are moving from producing to consuming mills only as required for specific business, usually in small quantities. Both nonintegrated sheet and strip mills are slowing down operating rates. Skelp output also is being curtailed since the wrought pipe trade is slipping, especially electrically welded line pipe. Billets, sheet bars and slabs hold at $30, Youngstown and Pittsburgh.

Cleveland—Specifications for sheet bars, billets and slabs continue at the light rate prevailing for several weeks. All three products are billed at $30, base, Cleveland and Youngstown, O.

Chicago — Second quarter contracting for semifinished steel is far below the opening weeks of first quarter. Billet and bloom prices are nominal at $31, Chicago, 4 x 4-inch base. Sheet bars are quiet, although April shipments will be ahead of March.

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago furnace	$17.50
Pittsburgh, dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Valley furnace	17.00
Cleveland fur., local del.	17.00
Philadelphia, delivered	17.76
Virginia, furnace	17.75
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.50
Buffalo, del. Boston	21.41 to 21.91
Buff., all-rail, Brooklyn	19.91 to 20.91
Buff., all-rail Newark	18.28 to 18.78
Ala., Bir. fur., local del.	12.00 to 13.00
Alabama, del. Chicago	17.01
Alabama, del. St. Louis	15.42
Alabama, del. Cincinnati	14.69 to 15.19
Ala., Phila., dock del.	16.25
Ala., Balt., dock del.	16.00
Alabama, New York dock	16.50
Ala., Boston dock del.	16.75
Tenn., Bir. base, local del	13.00
Tennessee, del. Cinn.	14.69 to 15.19
Montreal, delivered	23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	18.00
Buff., all-rail, Brooklyn	20.91 to 21.41
Buffalo, all-rail Newark	18.78 to 19.28
Buffalo, del. Boston	21.91 to 22.41
Virginia furnace	18.25
Eastern, del. Phila.	18.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	19.00
Eastern, del. Phila.	18.76 to 19.26

MALLEABLE

Valley furnace	17.00
Cleveland fur., local del.	17.00
Pittsburgh dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Chicago, furnace	17.50
Buffalo fur., local del.	18.00
Eastern Penna., delivered	18.26 to 20.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Eastern Penn., del.	17.25
Buffalo fur., local del.	17.00
Montreal, delivered	20.50
Valley, furnace	17.00

BESSEMER

Valley furnace	17.00
Pittsburgh, delivered	18.13 to 18.63
Pittsburgh, furnace	17.50

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	24.76 to 27.79
Copper-bear., E. Pa. fur.	22.50 to 23.00

GRAY FORGE

Valley furnace	16.50
Pittsburgh district fur.	17.00
Pittsburgh, delivered	17.63 to 18.13

CHARCOAL

Lake Superior, del. Chi.	27.04

SILVERY

Jackson County, O., fur., in per cents 6—$21; 7—$21.50; 8—$22; 9—$22.50; 10—$23; 11—$24; 12—$25; 13—$27.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents 10—$25; 11—$26; 12—$27; 13—$29; 14—$31; 15—$26; 16—$35.

Coke

Prices Per Net Tons

Beehive Ovens

Connellsville furnace	$2.50
Connellsville foundry	3.25 to 4.75
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	9.00 to 9.40
Chicago ovens	8.00
New England, del.	11.00
St. Louis, del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	5.50
Portsmouth, O., ovens, Connell., basis	5.50
Buffalo, ovens	8.00 to 8.50
Detroit, ovens	8.50
Philadelphia, del.	9.00

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports	
Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%, contract	10.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% manganese	10.00
North African low phosphorus	9.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish, North African basic, 50 to 60%	9.00
Newfoundland fdy., 55%	9.00
Tungsten, spot and future short ton unit, duty paid	$11.25 to $11.50
Chrome ore, 48% net ton c.i.f.	$21.50 to 22.00

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	26 to 28 cents
South African, 52%	26 to 28 cents
South African, 49-51%	25 to 26 cents
South African, 44-47%	24 cents
Indian, 48-50%	nom.
Brazilian, 46-48% (nom.)	22 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	$40.00
Georgia, Alabama	40.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	35.00
Georgia, Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	40.00
Joliet, Ill., East Chicago, Ind.	49.00
Birmingham, Ala.	50.00 to 51.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	$65.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.00

CHROME BRICK

Net ton, Chester, Pa., and Baltimore base, 9 x 4½ x 2½	45.00

Semifinished Steel

PRICES PER GROSS TON

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$30.00
Pittsburgh, bessemer	30.00
Youngstown	30.00
Cleveland	30.00
Philadelphia	35.30
Chicago	31.00
Forging, Chicago	36.00
Forging, Pittsburgh	36.00
Forging, Philadelphia	40.30

SHEET BARS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00
Chicago	31.00

SLABS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00

WIRE RODS

Pittsburgh, Cleveland	37.00
Chicago	38.00

SKELP

All grades, Pittsburgh	1.60c

Ferroalloys

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$85.00
*Ferromanganese, del. Pittsburgh	89.79
Spiegeleisen, 19-20%, domestic fur. spot†	30.00
Ferrosilicon, 50 per cent, freight all., c. l.	83.50
Do, less carload	88.50
Do, 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., con., del.	11.00
Do, for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.10 to 1.15
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plants, net ton	150.00
Do, one-ton to c. l.	170.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50

†Carloads. Differentials apply to large quantities.

*To users of carloads to 500 tons annually. Differentials apply to users of larger quantities.

Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky and Illinois mines, per net ton	$14.00 to 14.50
Washed gravel, import duty paid east, tide, gross ton	19.00

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Seamless for SAFETY!

CONSTANTLY increasing pressures are searching out the weak spots in boiler tubes. Unless tubes with sufficient strength are installed, be prepared for early return of the maintenance crew.

To provide long, economical tube life, use seamless boiler tubes of TONCAN IRON—the only iron tube available in seamless form.

TONCAN, the well known alloy of iron, copper and molybdenum, has a superior resistance to corrosion, and lasts longer. It works and welds easily, and cold working has practically no effect on its corrosion-resisting properties. Moreover, the *seamless* Toncan tube removes any uncertainty due to welds.

For longer tube life, specify Seamless TONCAN IRON for boilers in every class of service. Send for the TONCAN TUBE booklet.

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IRON

THE
BABCOCK & WILCOX TUBE COMPANY
BEAVER FALLS PENNSYLVANIA

Pig Iron

Sales Continue Restricted to Small Lots—Shipments Hold Up —Prices Are Unchanged

PIG IRON PRICES, PAGE 74

Pittsburgh—Shipments of pig iron are fairly well sustained but this tonnage is not being replaced generally with new business. Orders are off slightly from the recent rate, except for one substantial lot of basic and bessemer iron, understood to have been placed by a nonintegrated steel producer with a steelworks interest. The iron will be shipped by water and the price paid was not disclosed. Other sales are made up entirely of small lots, with $17, valley, continuing the usual price of No. 2 foundry, malleable, bessemer and basic.

Boston—Business is quieter, sales in the New England district in the past week dropping to approximately 1000 tons. One melter is sounding the market on 4000 to 5000 tons, and another is expected to close May 1 for about 2000 tons.

New York—Pig iron buying is comprised of small scattered lots, the total for the past week being 5000 tons. Prices are unchanged and untested, Buffalo iron, holding at $15 to $16, furnace, for delivery in this district, and southern iron at $11, Birmingham. Compton & Knowles, Boston, divided 1000 tons between the New England producer and a New York furnace. The A. P. Smith Mfg. Co., Bloomfield, N. J., is inquiring for 500 tons, and another interest is inquiring for 1200 tons for shipment outside this district.

Philadelphia—A sale of 300 tons of foundry iron appears to top transactions for the week. Trading is spotty. Foundry iron prices are easy at $17, eastern furnace, subject to concessions to meet outside competition. Southern iron is steady at $16.25, Philadelphia docks. Basic is $17.25.

Buffalo—Pig iron sales and inquiry are lower this week, with shipments also on the downward trend. Prices and operations are unchanged. Although the barge canal is open there is no demand for boats to move iron eastward, because of low quotations there on iron from other districts.

Youngstown, O.—Sales and shipments of pig iron continue restricted mainly to car lots for immediate consumption. Even the ingot mold companies, which take the bulk of the iron in molten state, are operating more intermittently than a month ago. Quotations remain at $17, valley, for bessemer, basic, No. 2 foundry and malleable grades, with No. 3 and forge iron bringing 50 cents less.

Cleveland—Purchasing continues restricted to small and moderate size lots, orders booked by furnace interests with headquarters in Cleveland totaling 9000 tons in the past week, a decrease of 3000 tons from sales in the week preceding. Inquiry is light and does not indicate any change from the hand-to-mouth character of business noted in recent weeks. Shipments so far this month are slightly better than the March rate. No. 2 foundry and malleable holds at $17, base, Cleveland, for local delivery, and $16, minimum, for outside shipment. Lake furnace prices are $16 to $17, base, in western and southern Ohio and in central and eastern Indiana.

Cincinnati—Demand for pig iron is limited to immediate needs. Sales during the past week passed 2000 tons, chiefly in carload lots, with only about 300 tons of southern iron ordered. Prices continue unchanged except on northern iron in highly competitive territory. One Ohio melter is in the market for 500 tons, and another for 300 tons.

Chicago—Small orders for early delivery predominate, the price continuing $17.50, base, furnace. One or two buyers have contracted for part of their estimated third quarter requirements. No arrangements are being made for new shipments of iron by vessel to Chicago as fairly substantial amounts remain on dock. About 300 to 400 tons of silvery iron was sold direct by an eastern furnace to a western automotive interest.

St. Louis—Shipments continue at the March rate, but sales during the past week, amounting to 2000 tons, were the smallest since the middle of February. Inquiry is light. Prices are steady at $17.50, base, furnace, for northern iron and $11, furnace, for southern.

Birmingham, Ala.—A few contracts have been booked recently for second quarter, though small orders for prompt shipment predominate. Furnace stocks are being reduced gradually. Prices are unchanged.

Toronto, Ont.—Merchant pig iron sales increased to 1000 tons in the past week, nearly all in 50 to 100-ton lots. Practically nothing is being done in contract business. Prices are steady.

Ferroalloys in Quiet Market; Prices Steady

Ferroalloy Prices, Page 74

New York—Demand for ferroalloys is quiet. Ferromanganese is steady at $85, duty paid, for carloads. Spiegeleisen, 19 to 20 per cent, is $30, furnace. Developments in special ferroalloys are of a routine character, with prices firm. The tungsten market continues dull and nominal.

Pittsburgh—Demand for ferroalloys is hesitant and shipments of most grades lack improvement from the rate of recent weeks. Specifications for ferromanganese and spiegeleisen are in about the March volume and reflect recent hesitancy in steelmaking operations. Prices generally are steady with ferromanganese continuing $89.79, delivered, and spiegeleisen $30, furnace, for small lots.

Bid on 500 Tons Bronze

New York—Bids close April 28, board of water supply, on approximately 500 tons of manganese bronze pipe and castings and 133,000 pounds of steel castings in connection with drainage shaft 9A, city tunnel No. 2. Included in the work are two 66-inch bronze section valves, two lines of 66-inch bronze waterway castings, two bronze doors, two 60-inch bronze gate valves, two 16-inch bronze needle valves, one 18-inch and one 6-inch bronze check valves, bronze piping, miscellaneous bronze, steel castings and appurtenances. About 75 per cent of the tonnage will be 8 to 66-inch pipe. Castings ranging from 28,000 pounds to half a pound are included in specifications. Considerable machining will be necessary on the large valve castings.

Cut Nails Advanced $2

New York—Cut nails have been advanced $2 a ton, now holding at 2.50c, Pittsburgh, in carloads, 2.75c in less carloads but in 5-keg lots and over, and 2.90c in less than 5-keg lots.

William Luitink & Sons Mfg. Co., 775 Eighteenth street, Milwaukee, manufacturer of tools, dies, jigs and fixtures, has changed its name to Luitink Mfg. Co.

Scrap

Price Recession General as Heavy Tonnages and Light Buying Increase Reserve Stocks

Chicago—Heavier actual and potential scrap offerings are tending to weaken prices after weeks of dealer resistance to buyers' downward pressure. The Chicago & Eastern Illinois railroad scrapping program of 6000 to 8000 cars looms in the market, while several roads, including the Pennsylvania, have been deferring monthly sales of scrap, which are likely to be a factor soon. Offerings by smaller yard interests with accumulated scrap, released frequently to relieve carrying charges, contribute to a more fluid market. More distress scrap is expected shortly. Dealers with important unfilled short orders are buying more easily. A leading independent steelworks again is limiting shipments. Several grades are down 25 to 50 cents, in-

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

HEAVY MELTING STEEL

Birmingham	9.50 to 11.00
Boston, dealers	6.50 to 7.10
Buffalo, No. 1	10.00 to 10.50
Buffalo, No. 2	9.25 to 9.50
Chicago	9.75 to 10.25
Cinci., deal.	9.00 to 9.50
Cleve., No. 1	9.75 to 10.25
Cleve., No. 2	9.50 to 9.75
Det., No. 1 deal.	8.50 to 9.00
Det., No. 2 deal.	7.25 to 7.75
E. Pa. del. mill	10.00 to 11.00
N. Y. deal. R. R.	7.00
N. Y. deal. No. 2	5.50
N. Y. deal. yd.	5.00
Pitts., No. 1	12.00 to 12.50
St. L. No. 1 sel	8.75 to 9.25
Federal, Ill.	8.50 to 9.00
Granite City, Ill.	8.00 to 8.50
Valleys, No. 1	11.75 to 12.25

COMPRESSED SHEETS

Buffalo, dealers	9.25 to 9.50
Chicago	8.25 to 8.75
Cleveland	8.00 to 8.50
Detroit, dealers	8.50 to 9.00
E. Pa. new mat.	9.00 to 10.00
Pittsburgh	12.00 to 12.50
Valleys	11.25 to 11.75

BUNDLED SHEETS

Buffalo	7.00 to 7.50
Cinci., deal.	8.50 to 9.00
Cleveland	7.00 to 7.25
Eastern Pa.	8.50
Pittsburgh	11.00 to 11.50
St. Louis	5.50 to 6.00

SHEET CLIPPINGS LOOSE

Chicago	5.00 to 5.50
Cincinnati	5.00 to 5.50
Detroit, dealers	5.50 to 6.00
St. Louis	5.50 to 6.00

STEEL RAILS SHORT

Birmingham	12.00 to 12.50
Boston, dealers	5.50 to 7.10
Buffalo	13.75 to 14.25
Chicago (3 ft.)	11.25 to 11.75
Chicago (2 ft.)	12.25 to 12.75
Cinci., deal.	14.25 to 14.75
Detroit, deal.	12.50 to 13.00
Pitts. (open-hearth, 3 ft and less)	14.50 to 15.00
St. Louis	12.00 to 12.50

STOVE PLATE

Birmingham	8.00 to 8.50
Boston, con.	8.00 to 8.50
Buffalo	8.75 to 9.00
Chicago, net	7.75 to 8.25
Cinci., deal. net	5.25 to 5.75
Det., net, deal.	6.25 to 6.75
Eastern Pa.	9.00 to 9.50
N. Y., deal. mill	4.75
St. Louis	7.75 to 8.25

COUPLERS, SPRING

Buffalo	13.50 to 14.00
Chicago	11.50 to 12.00
Eastern Pa.	16.50
Pittsburgh	15.50 to 16.00
St. Louis	9.50 to 10.00

ANGLE BARS—STEEL

Chicago	11.00 to 11.50
St. Louis	8.50 to 9.00

LOW PHOSPHORUS

Buff., billets and bloom crops	15.00 to 15.50
Cleveland bil. and bloom crops	14.50 to 15.00
Eastern Pa.	17.00
Pittsburgh billet bloom crops	17.00 to 18.00
Pitts. sheet bar crops	16.50 to 17.00

FROGS, SWITCHES

Chicago	10.50 to 11.00
St. Louis	9.00 to 9.50

SHOVELING STEEL

Chicago	9.75 to 10.25
Cleveland	6.75 to 7.00
St. Louis	8.50 to 9.00

RAILROAD WROUGHT

Birmingham	8.50 to 9.00
Boston, dealers	8.00 to 8.50
Buffalo, No. 1	8.25 to 8.75
Buffalo, No. 2	10.75 to 11.25
Chicago, No. 1	9.00 to 9.50
Chicago, No. 2	9.75 to 10.25
Cinci., No. 2	9.00 to 9.50
Eastern Pa.	11.00
N. Y., No. 1 deal.	10.00 to 10.50
Pitts., No. 2	12.00 to 12.50
St. Louis, No. 1	7.00 to 7.50
St. Louis, No. 2	8.50 to 9.00

SPECIFICATION PIPE

Boston	5.60 to 6.10
Eastern Pa.	11.50 to 12.00
N. Y., deal.	7.25 to 7.50

BUSHELING

Buffalo, No. 1	9.25 to 9.50
Chicago, No. 1	8.00 to 8.50
Cinn., No. 1 dl.	7.50 to 8.00
Cinn., No. 2	4.50 to 5.00
Cleve., No. 2	6.25 to 6.75
Det., No. 1 new deal.	7.00 to 7.50
St. L., No. 1	6.00 to 6.50
Val. new No. 1	10.50 to 11.00

MACHINE TURNINGS

Birmingham	6.50 to 7.00
Boston, dealers	2.00 to 2.25
Buffalo	5.50 to 6.00
Chicago	4.25 to 4.75
Cinn., deal.	4.50 to 5.00
Cleveland	4.25 to 4.75
Detroit	3.50 to 4.00
Eastern Pa.	7.00 to 7.50
N. Y., deal.	3.00
Pittsburgh	7.00 to 7.50
St. Louis	4.00 to 4.50
Valleys	8.00 to 8.25

BORINGS AND TURNINGS
For Blast Furnace Use

Boston	2.00 to 2.50
Buffalo	6.50 to 7.00
Cinn., deal.	4.50 to 5.00
Cleveland	6.50 to 7.00
Detroit, deal.	4.00 to 4.50
Eastern Pa.	6.00 to 7.00
N. Y., deal.	3.00
Pittsburgh	7.50 to 8.00

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	6.50 to 7.00
Boston, chem.	9.10 to 9.60
Boston, deal.	2.00 to 2.50
Buffalo	6.50 to 7.00
Chicago	4.75 to 5.25
Cinn., deal.	4.50 to 5.00
Cleveland	6.50 to 7.00
Detroit, deal.	4.00 to 4.50
Eastern Pa.	7.00 to 7.50
E. Pa., chem.	13.50 to 14.50
N. Y., deal.	3.50
Pittsburgh	7.50 to 8.00
St. Louis	5.50 to 6.00

PIPE AND FLUES

Cinn., deal.	7.50 to 8.00

RAILROAD GRATE BARS

Buffalo	7.25 to 7.75
Chicago, net	7.00 to 7.75
Cincinnati	7.00 to 7.50
Eastern Pa.	9.00 to 9.50
N. Y., deal.	6.00
St. Louis	6.00 to 6.50

FORGE FLASHINGS

Boston, deal	5.50 to 6.00
Buffalo	9.00 to 9.50
Cleve. ov. 10 in.	9.75 to 10.25
Detroit	7.50 to 8.00

FORGE SCRAP

Boston, del.	5.00 to 5.50
Chicago	12.50 to 13.00
Eastern Pa.	10.50 to 11.00

ARCH BARS, TRANSOMS

Chicago, net	10.50 to 11.00
St. Louis	11.00 to 11.50

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	9.25 to 9.75
Chi., steelworks	8.00 to 8.50
Cleveland	8.00 to 8.50
Eastern Pa.	11.00
Pittsburgh	10.00 to 10.50
St. Louis	7.00 to 7.50

STEEL CAR AXLES

Birmingham	14.00 to 14.50
Boston, ship. pt.	14.00 to 15.00
Buffalo	15.50 to 16.00
Chicago	14.00 to 14.55
Eastern Pa.	18.50 to 19.50
St. Louis	12.50 to 13.00

SHAFTING

Bos., ship. pt.	13.00 to 13.50
Chicago	10.65 to 11.20
N. Y., deal.	13.00 to 14.00
St. Louis	10.50 to 11.00
E. Penna.	18.00

CAR WHEELS

Birming., iron	10.00 to 10.50
Boston, iron	14.00 to 14.50
Buffalo, iron	12.00 to 12.50
Buffalo, steel	13.50 to 14.00
Chicago, iron	9.50 to 10.00
Chi., roll steel	12.25 to 12.75
Cincinnati, iron	10.50 to 11.00
E. Pa. steel	15.00 to 15.50
E. Pa. iron	13.50 to 14.00
Pitts., iron	13.00 to 13.50
Pitts., steel	15.50 to 16.00
St. Louis, iron	8.00 to 8.50
St. Louis, steel	11.00 to 11.50

NO. 1 CAST SCRAP

Birmingham	10.00 to 10.50
Buffalo (mach.)	11.00 to 11.50
Boston, textile	10.00 to 10.50
Chicago, mach.	10.35 to 10.90
Chi., railroad	9.25 to 9.80
Chicago, agri.	8.70 to 9.25
Cinn., mach. cup., gross	13.00 to 13.50
Cleve. cupola	12.00 to 12.50
Det., net deal.	8.50 to 9.00
E. Pa. cupola	13.00
N. Y. cup deal.	8.00 to 8.50
N. Y., del. local foundries	12.00
Pitts., cupola	12.00 to 12.50
San Fran., del.	13.50 to 14.00
Seattle	8.50 to 9.00
St. L. No. 1 ma	9.00 to 9.50
St. L. No. 1	8.50 to 9.00

HEAVY CAST

Boston	10.50 to 11.00
Bos. mach. cast.	11.50 to 12.50
Buffalo, break	8.00 to 8.50
Cleve., break	6.50 to 7.00
Detroit, auto, net deal.	10.50 to 11.00
Det., break., dl.	6.50 to 7.00
Eastern Pa.	11.00
N. Y. No. 1 dl.	8.00 to 8.50
N. Y. break. dl.	7.00 to 7.50
Pittsburgh	9.00 to 9.50

MALLEABLE

Boston R. R.	13.00 to 13.50
Buffalo	12.00 to 12.50
Chicago, agri.	10.50 to 11.00
Chicago, R. R.	11.50 to 12.00
Cinn., R. R. dl.	11.50 to 12.00
Cinn, agri., dl.	12.00 to 12.50
Cleveland, rail	12.00 to 12.50
Det. auto deal.	10.50 to 11.00
St. Louis, rail	9.00 to 9.50

RAILS FOR ROLLING
5 feet and over

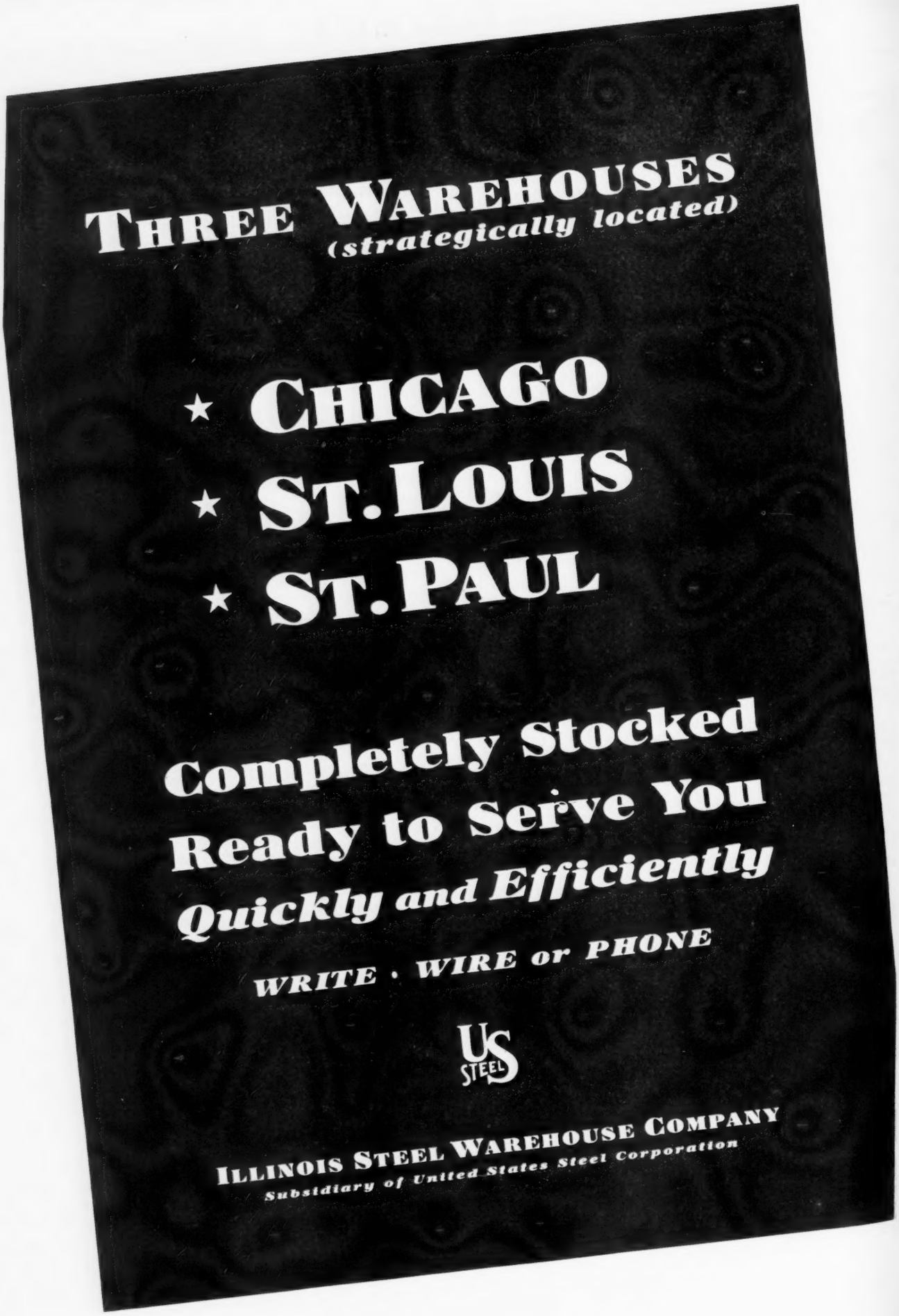
Birmingham	10.25 to 10.75
Boston	8.50 to 9.00
Buffalo	10.75 to 11.25
Chicago	12.00 to 12.50
Eastern Pa.	13.00 to 13.50
New York	9.00 to 9.50
St. Louis	10.25 to 10.75

LOCOMOTIVE TIRES

Chicago, cut	12.50 to 13.00
St. L. No. 1	11.00 to 11.50

LOW PHOS. PUNCHINGS

Chicago	11.25 to 11.75
Buffalo	14.00 to 14.50
Eastern Pa.	15.50 to 16.50
Pittsburgh	15.00 to 15.50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cluding railroad malleable and hydraulic compressed sheets. It is stated melting steel at $10.25 has been turned down.

Boston—The market for scrap remains dull and current business is wholly for New England consumption. The materials that have been moving are heavy melting steel, T rails, bundled skeleton and some textile machinery. Recently textile has been bringing $10 to $10.50 delivered, which is a slight improvement over recent weeks.

Philadelphia—Steel and iron scrap is featured by an advance in heavy breakable cast to a range of $11 to $11.50, delivered, and a reduction of No. 2 melting steel to $8.50 to $9. Phoenix Iron Co. is reported to have taken 1000 tons of the latter. General trading is dull, the three leading consumers still deferring shipments. Florence Pipe Foundry & Machine Co., Florence, N. J., is a recent purchaser of heavy breakable cast.

Buffalo—Local dealers have been given an order for about 2000 tons of heavy melting steel for delivery at Lackawanna at $11 for No. 1 and $9.50 for No. 2. On direct sales of railroad material No. 1 is reported to have brought $11.25. Other materials are lower in a weak market, with small lots of stove plate reported to have been sold at $9 and of blast furnace scrap at $7.25.

Pittsburgh—Most grades of steel and iron scrap are 25 to 50 cents lower in a dull market. Heavy melting steel has sold at $12.50, representing a 50-cent decline, compressed sheets are quotable at the same figure. Blast furnace grades are down on a sale at $8, while machine turnings are lower on a sale at $7.50. Buying of all grades is confined to small lots.

Cleveland—Leading iron and steel scrap grades are quoted 25 to 50 cents a ton lower. Further holdups by mills have served to accentuate an already weak situation. Scrap yard activity is nearly at a standstill. A few cars of scrap are moving to Lowellville, O. The Warren, O., consumer is holding up shipments. Demand from Youngstown is negligible.

Detroit—Further decline in steel and iron scrap has brought prices to a lower level, 25 to 50 cents per ton having been taken from previous quotations. Weakness is evident in every department.

Cincinnati—Iron and steel scrap continues dull. Volume has increased somewhat by recent demand for special items. An important consumer is continuing an embargo on shipments.

St. Louis—Iron and steel scrap prices continue to fall, new low levels having been reached for all grades and descriptions. Specific cuts range from 25 cents to $1.50 per ton. The general situation, however, has been considerably relieved by the purchase of round tonnages of steel by two leading mill interests. The exact amount involved in these sales has not been divulged, but it is understood to represent the largest total in a number of months.

Toronto, Ont. — With Hamilton mills taking delivery of steel scrap improvement in this grade is reported. Shipments, however, are somewhat restricted, due to strict specifications of the Steel Co. of Canada. In the Montreal market dealers report a better demand for steel scrap but tonnages are small. Consumers are placing orders for machinery cast and supplies in this district are running low. Prices are unchanged.

Birmingham, Ala.—Buyers practically make prices on old material. With the exception of heavy melting steel and No. 1 cast not much business is visible.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$11.00
Steel axles	10.00
Car wheels	8.00
Stove plate	8.00
Wrought pipe	2.00
Turnings	2.00
Heavy melting steel	6.00

TORONTO

Steel axles	7.00
Iron axles	7.00
Heavy melting steel	7.00
Turnings	2.00
No. 1 mach. cast (net)	9.00
Malleable (net)	7.00

Iron Ore Prices Near Determination; Season Slow

Iron Ore Prices, Page 74

Cleveland—Negotiations for the Ford Motor Co.'s 290,000 tons of Lake Superior iron ore were nearing a close Tuesday, April 14, with expectations that prices soon would be formally established. Producers submitted last year's prices, and expressed the belief that they would be renewed. Late estimates of the total amount of ore to be moved this year range from 40,000,000 to 41,000,000 tons, the lowest since 1921. In 1930 shipments totaled 47,184,869 tons, and in 1929 they were 66,163,637 tons. Navigation on the Great Lakes opened officially April 15 but some of the largest ore carrying fleets have not been made ready for operation, and instead of April it will be late in May or June before the iron ore shipping season is actually under way.

Coke

Beehive Furnace Fuel Sells Down to $2.25—Market Less Active Than Month Ago

COKE PRICES, PAGE 74

Pittsburgh—Demand for beehive coke is tapering gradually. Furnace coke is less active than a month ago, while foundry grades also lack improvement. Furnace fuel holds around $2.50, with occasional sales at less, while foundry coke continues $3.25, minimum.

New York—Decided easiness prevails in coke, with standard furnace grades dipping to $2.25 Connellsville, and standard grades of foundry moving generally at $3.25, Connellsville, Pa. Some sellers are maintaining higher quotations, but they are largely nominal. By-product coke is $9 to $9.40, Newark, N. J.; $11, New England, and $9, Philadelphia.

Cincinnati—Specifications for by-product foundry coke are showing an upturn, reflecting a better melt.

Chicago—By-product foundry coke shipments are making no appreciable gain over March. Ovens are operating at 50 to 60 per cent. The price is $8, ovens.

St. Louis—Demand for metallurgical coke shows little change, users specifying for what they need immediately, and new contracting remaining light. No revision of prices is anticipated during the second quarter.

Birmingham, Ala.—Less than 450 by-products coke ovens of 1390 in this district are idle. Independent producers are moving their output steadily. The foundry grade continues to bring $5, base, Birmingham.

Pacific Coast

Dull Demand Rules with Public Projects Most Active—California Totals Lead Last Year in Most Lines—Northwest Activity Is Slack—Scrap Prices Lowest Encountered in 20 Years

Seattle—Pacific Northwest turnover in iron and steel products continues to drag. Some lines are unusually depressed while others are equal to a year ago.

Pig Iron and Coke

Demand for pig iron and coke is far below normal and the poorest in several years. Foundries are short of orders, many of them closed indefinitely. Logging and industrial depression are being generally felt. About one-third the volume of coke imported last year is being brought in from Great Britain this spring. Sales of pig iron are small. Prices of iron and coke remain unchanged.

Bars, Plates and Shapes

Mill prices of bars, plates and shapes remain unchanged, merchant bars, 2.15c, shapes, 2.05c, and plates, 2.00c.

Local mills are having a poor run of business. There is little demand for merchant bars, railroad requirements are small and reduced building construction is reflected in the few specifications involving reinforcing material. Pacific Coast Steel Corp. has booked 100 tons for the Puget Sound navy yard. Business pending is unimportant. Several projects calling for concrete bars have failed to develop.

Plate inquiries are few and involve only small tonnages. Seattle is inviting bids for a 75-million gallon reservoir and two standpipes of one million gallons capacity each, involving about 700 tons of plates, in addition to a small tonnage of 20 and 24-inch lockbar and lapwelded steel pipe, steel castings and cast iron pipe.

Wallace Bridge & Structural Steel Co., Seattle, has the contract to fabricate two steel spans for Alaska and one for Clallam county, Wash., involving a total of 125 tons of structurals. Contract to fabricate 450 tons of shapes for a new warehouse at the Seattle plant of the Pacific Coast Steel Corp., reported in STEEL, March 12, has been divided between Pacific Car & Foundry Co. and Isaacson Iron Works, Seattle. The latter firm will erect the steel, which will be rolled by the local plant of the Pacific Coast Steel Corp. Minister of public works, Victoria, B. C., is considering bids for the Nechako river bridge, said to involve about 200 tons of shapes. Low bidder is Stuart Cameron & Co. Ltd., Vancouver, B. C., at $46,284.

Coast Pig Iron Prices

Utah basic	$22.00 to 24.00
Utah foundry	22.00 to 24.00
*German	24.25
*Indian	22.00 to 24.00

*C.i.f. duty paid.

Finished Materials Unsteady

Wholesale jobbers report trade spotted and unsteady. Demand is variable and the usual spring activity is lacking. Sheets are in slightly better demand, light plates are moving in smaller volume, bars are in fair demand. Retail stocks are low, but there there is no disposition to replenish.

Pipe Buying Is Small

While some pipe tonnages are still pending, new business is unimportant and of small volume. Bookings this week include 175 tons for Camp Murray and Fort Lewis, Wash., taken by American Cast Iron Pipe Co. through R. C. Polk, Seattle. The same agency also closed a contract for furnishing meters to Shelton, Wash. United States Pipe & Foundry Co., through H. G. Purcell, Seattle, closed for 100 tons for Lynden, Wash. Seattle has opened bids for about 850 tons for Eighth avenue S. W. Tacoma has placed orders for 30 tons of 18-inch steel pipe and 16,000 feet of galvanized pipe, one to 6 inches. W. C. Morse, Seattle engineer, is making a survey for La Conner, Wash., which proposes to install a $40,000 water system including 35,000 feet of 6-inch pipe and a 200,000-gallon reservoir.

Old Materials Are Weak

The market is the weakest in years, prices being at the lowest level in two decades. Local mills, which were paying $7.50 and $8, gross, for both steel and cast iron scrap, have reduced the maximum price to $7.50. Receipts continue in excess of requirements and grades are being well maintained notwithstanding the unattractive prices. There is no export inquiry. Foundries are buying only occasional small tonnages of cast iron. This material is moving only in small lots and is evidently being held for improved market conditions.

Highways and Bridges Lead

San Francisco—(*By Air Mail*)—Demand for steel products on the Pacific Coast has shown little improvement during the past ten days. State and county highway and bridge projects comprise most current bookings in structural shapes and reinforcing steel bars. Prices are unchanged, though weak.

Bars, Plates and Shapes

Awards of concrete bars aggregated close to 1500 tons and brought the total for the year to 17,150 tons, compared with 12,852 tons for the corresponding period in 1930. Included among the larger lots placed were 248 tons for highway work in San Diego county, Calif., and 200 tons for a laboratory in Pasadena, both taken by unstated interests. Bids have been opened on two highway projects in California, involving 254 tons and 123 tons. Bids will be opened April 29 on 108 tons for the Eel river bridge, Mendocino county, Calif. Los Angeles out-of-stock prices remain unchanged at 2.50c, base, on carload lots. San Francisco quotations hold at 2.60c, base.

Demand for plates is confined to unimportant tonnages and no large awards were reported placed. To date 62,365 tons have been booked, compared with 15,349 tons for the same period last year. No action has yet been taken on 300 tons for floating derrick for Mare Island. Prices range from 2.00c to 2.05c, c.i.f.

Structural awards were smallest of any week since the first week of the year and totaled less than 400 tons. This brings the aggregate for the year to 34,943 tons as compared with 29,604 tons for the corresponding period in 1930. An unstated interest took 250 tons for a bridge in Johnson county, Wyo. New inquiries include 303 tons and 198 tons for bridges over the Eel river and Clear Creek, respectively, both in California. Bids are being taken on 750 tons for an auto sales building on Wilshire boulevard, Los Angeles. Prices on plain material remain unchanged at 2.05c to 2.15c, c.i.f.

Other Finished Material

Cast iron pipe awards aggregated 2682 tons, bringing the total for the year to 25,055 tons, compared with 30,004 tons for the same period a year ago. Bids have been opened on 2725 tons of 16 to 24-inch pipe for Los Angeles and that city will open bids April 16 on 2896 tons of 6 and 12-inch pipe. Little of importance has transpired lately in the market for standard steel pipe and oil country goods.

Steel, Wrought and Cast Iron Pipe, and Tubing

Welded Iron, Steel Pipe

Base Price $200 Ton

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to jobbers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del., 2½ points less. Wrought iron pipe, Pittsburgh base.

BUTT WELD

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk	Gal.
⅛	58	44½	⅛	23	5
¼	62	50½	¼	28	11
⅜—⅜	64	52½	⅜	31	15
			½ and ¾	35	18

LAP WELD

2	57	45½	2	23	9
2½—6	61	49½	2½—3½	28	13
7—8	58	45½	4—6	30	17
9—10	56	43½	7 and 8	29	16
11—12	55	42½	9—12	26	11

BUTT WELD

Extra strong, plain ends

⅛	55	44½	¼ & ⅜	+13 +48
¼	60	49½	½	23 7
⅜—½	62	51½	¾	28 12
¾—3	63	52½	1—2	34 18

LAP WELD

Extra strong, plain ends

2	55	44½	2	29 13
2½—4	59	48½	2½—4	34 20
4½—6	58	47½	4½—6	33 19
7—8	54	41½	7 and 8	31 17
9—10	47	34½	9—12	21 8
11—12	46	33½		

To large jobbers these discounts on steel pipe increased on black by 1 point and two discounts of 5 per cent; on galvanized by 1½ points with two 5 per cents. On iron pipe large jobbers obtain additional discount of 1 point with 5 and 2½ per cent on black and galvanized.

BOILER TUBES

Carload Discounts, Lap Welded Steel		f.o.b. Pittsburgh Charcoal Iron	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¼—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

COLD DRAWN

1	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill

Random lengths over 5 ft. 55%
Selected lengths, 1 to 18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir. ....$35.00 to 36.00
Four-inch, Birmingham .... 39.00 to 40.00
Four-inch, Chicago ..... 46.00 to 48.00
Six to 24-inch, Chicago..... 42.00 to 44.00
Six-inch and over, N. Y..... 37.50 to 39.50
Four-inch, New York..... 40.50 to 41.50
Stand. fittings, Bir. base.... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher. Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

STEEL BARS

Baltimore	3.00c
Boston	3.265c
Buffalo	3.15c
Chattanooga	3.10c
Chicago	2.90c
Cincinnati	3.15c
Cleveland	2.85c
Detroit	3.00c
Houston	3.00c
Los Ang.	3.40c
New York‡(d)	3.10c
Philadelphia	2.60c
Pittsburgh	2.75c
Portland	3.15c
San Frans.	2.40c
Seattle	3.15c
St. Louis	3.15c
St. Paul	3.00c
Tulsa	3.65c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.15c
Chattanooga	3.10c
Chicago	3.00c
Cincinnati	3.15c
Detroit	3.00c
New York‡(d)	3.10c
Philadelphia	2.60c
St. Louis	3.15c
Tulsa	3.65c

REINFORC. BARS

Baltimore	2.50c-3.31c
Boston	3.265c
Buffalo	2.95c
Chattanooga	3.10c
Cincinnati	3.15c
Cleveland	2.25c-2.44c
Detroit	3.00c
Houston	3.00c
Los Ang. cl.	2.40c
Los Ang. lcl.	2.70c
New York	2.65c-3.10c
Phila.	2.40c-3.00c
Pittsburgh	2.75c
San Fran. cl.	2.30c
San Fran. lcl.	2.50c
Seattle	3.15c
St. Louis	3.15c
Tulsa	3.65c
Young.	2.30c-2.60c

SHAPES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los Ang.	3.40c
New York(d)	3.10c
Philadelphia	2.50c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

PLATES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.40c
New York(d)	3.30c
Philadelphia	2.50c
Phila. floor	5.10c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	2.75c

NO. 10 BLUE

Baltimore	3.25c
Boston	3.915c
Buffalo	3.50c
Chattanooga	3.60c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.10c
Detroit	3.35c
Houston	3.90c
Los Ang.	3.95c
N. Y. (d)	3.00c-3.40c
Portland	4.00c
Phila.*†	3.05c
Pitts.**	3.10c
San Fran.	3.65c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.40c
Tulsa	3.95c

NO. 24 BLACK

Balt.*†	3.50c
Boston	4.70c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	3.90c
Clev.***	3.75c
Detroit	3.75c
Los Ang.	4.70c
New York	3.50c-3.65c
Phila.*†	3.60c
Pitts.**	3.35c to 3.40c
Portland	4.50c
San Fran.	4.15c
Seattle	4.50c
St. Louis	3.95c
St. Paul	3.545c
Tulsa	4.10c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston	5.45c
Buffalo	4.40c-4.60c
Chicago (local del.)	4.35c
Chicago (outside)	4.35c-4.60c
Cincinnati	4.40c
Cleveland	4.00c
Detroit	4.25c
Houston	5.40c
Los Ang.	5.10c
New York	4.00c-4.10c
Phila.*†	4.15c
Pitts.**	3.90c to 4.00c
Portland	5.00c
San Fran.	4.65c
Seattle	5.00c
St. Louis	4.40c
St. Paul	4.23c
Tulsa	4.60c-4.75c

BANDS

Baltimore	3.50c
Boston	4.015c-5.00c
Buffalo	3.50c
Chattanooga	3.30c
Chicago	3.10c
Cincinnati	3.35c
Cleveland	3.10c
Det. 3/16-in. & lighter	3.30c
Houston	3.65c
Los Ang.	4.30c
New York(d)	3.40c
Philadelphia	2.90c
Pittsburgh	3.10c
Portland	3.50c
San Fran.	3.75c
Seattle	4.15c
St. Paul	3.75c
Tulsa	3.85c

HOOPS

Baltimore	3.50c
Boston	5.50c-6.00c
Buffalo	3.90c
Chicago	3.65c
Cincinnati	3.90c
Cleveland	3.65c
Det. No. 14 & lighter	3.80c
New York	3.75c
Philadelphia	3.15c
Pittsburgh	4.10c
Seattle	5.15c
St. Paul	3.75c

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)	3.30c
Boston	3.50c
Buffalo	3.15c
Chattanooga*	3.85c
Chicago	3.35c
Cincinnati	3.30c
Cleveland	3.40c
Detroit	3.65c
Los Ang. (a)	4.50c
New York	3.40c
Philadelphia*	3.40c
Pittsburgh	3.35c
Portland (a)	4.50c
San Fran.(a)	4.25c
Seattle (a)	4.75c
St. Paul (a)	3.85c
St. Louis	3.60c
Tulsa	4.75c

Flats and squares 5½c extra, except Tulsa, where 5.14c is quoted. (a) Rounds, hex. only.

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	5.65c
Chicago (soft) (b)	6.15c
Cincinnati	6.10c
Clev. (b)	5.95c
Detroit	5.40c
Phila. (c)	4.85c
New York	5.05c

(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
‡Domestic bars.
*Plus quantity extras.
**Less than 25 sheets.
*†50 or more bundles.

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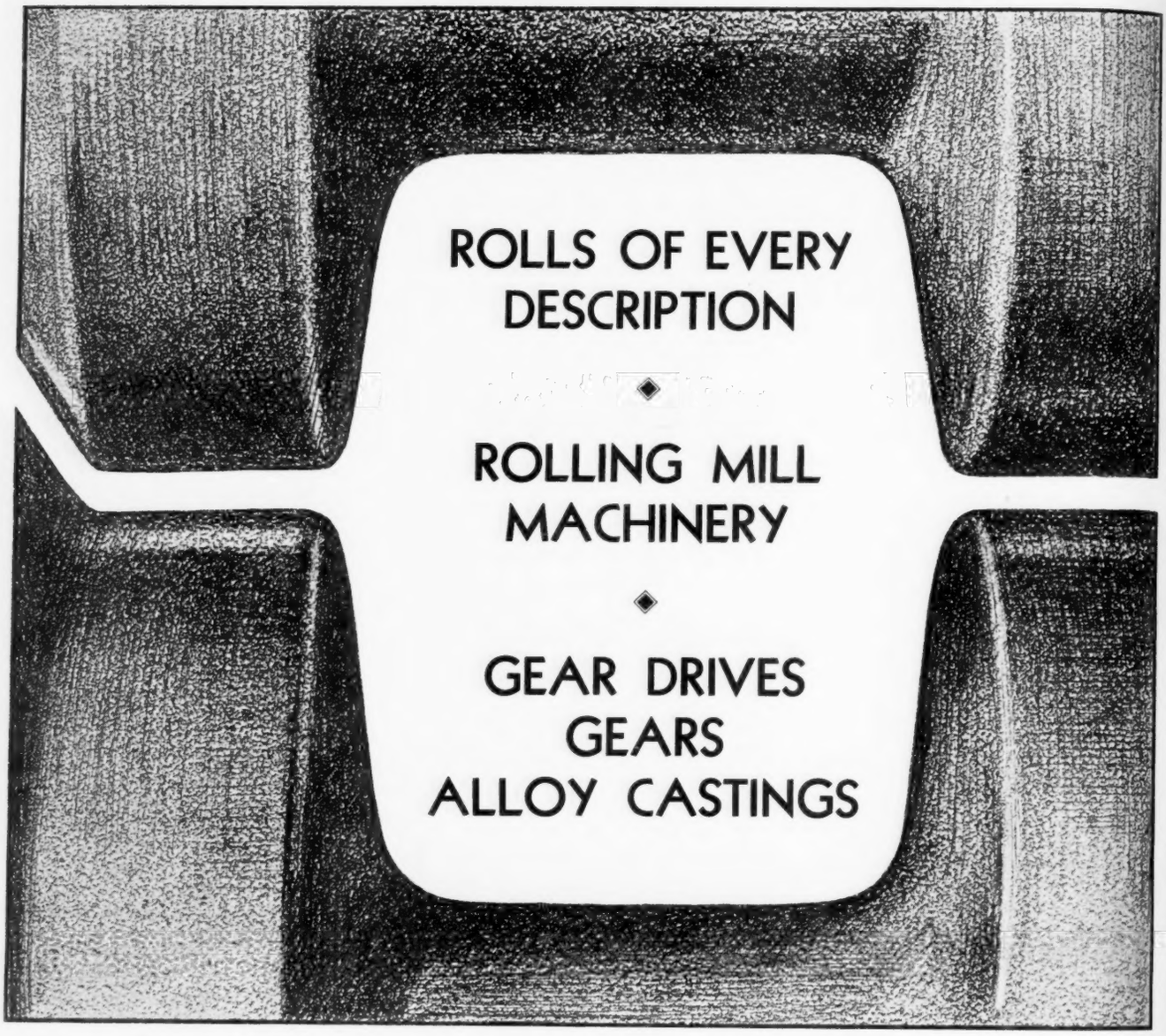

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PITTSBURGH, PA.

Midland Division
MIDLAND, PA.

Wooster Division
WOOSTER, OHIO

Mill Products

Base price cents per pound f.o.b. mill, except otherwise specified. Copper and brass product prices based on 10.00c, Conn., for copper

Sheets	
Yellow brass (high)	17.25
Copper, hot rolled	19.87½
Lead, full sheets (cut ½c more)	8.50
Zinc sheet (100-lb. base)	9.50
Tubes and Pipes	
Seamless yellow brass (high)	22.12½
Seamless copper	22.37½
Rods	
Yellow brass (high, full turnings)	15.50
Naval brass	16.50
Anodes	
Copper, untrimmed	17.37½
Wire	
Yellow brass (high)	17.75

Old Metals

Dealers' buying prices, cents lb.

Heavy Red Brass	
New York	6.50 to 6.75
Chicago	6.00 to 6.50
Cleveland	6.50 to 7.00
St. Louis	6.25 to 6.50
Heavy Yellow Brass	
New York	4.25 to 4.50
Heavy Copper and Wire	
New York	7.50 to 7.75
Boston	7.25 to 7.50
Chicago	6.75 to 7.25
Cleveland	6.50 to 7.00
St. Louis	6.50 to 7.00
Red Brass Borings	
New York	6.25 to 6.50
Yellow Brass Tubing	
Cleveland	4.00 to 4.50
Light Copper	
New York	6.75 to 7.00
Chicago	6.00 to 6.25
Cleveland	6.00 to 6.25
St. Louis	6.50
Light Brass	
Boston	3.50 to 3.75
Chicago	3.75 to 4.00
Cleveland	3.00 to 3.25
St. Louis	3.50 to 3.75
Zinc	
New York	1.50 to 1.75
Cleveland	1.25 to 1.50
St. Louis	2.00
Aluminum	
Clippings, soft, Cleveland	12.00 to 13.00
Clippings, hard, Cleveland	10.00 to 11.00
Borings, Cleveland	4.50 to 5.00
Mixed cast, Cleveland	5.00 to 5.50
Mixed cast, Boston	4.00 to 4.50
Mixed cast, St. Louis	4.50

Secondary Metals

Remelt aluminum No. 12	11.00 to 11.50
Brass ingots, 85-5-5-5	9.50

Metals

Demand Picks Up Slightly as Copper Prices Strengthen—Zinc Eases in Dull Market

New York—Activity in nonferrous metals has picked up slightly during the past week. Copper, with a recovery to a firm 10-cent price, was the feature of the week. Buying of lead is improving a little, but poor business has depressed zinc to the lowest price in 30 years.

Business in mill products remains dull. Copper wire prices have been restored to the basis of 10-cent copper. Other copper and brass products had not deviated from the 10-cent basis.

Copper—Business has been done at 10.00c, Connecticut. Export business, especially, has picked up in the past day or two. The market now looks very firm. March statistics were stronger than expected. Total stocks of copper were cut nearly 14,000 tons, the smallest in about a year. Refined stocks are 354,205 tons, or more than three times normal size and equal to more than three months' shipments at the current rate. Reduction in stocks last month was due to lower output and larger shipments. Curtailment in the past few months, however, has made little additional progress.

Zinc—New business has continued extremely quiet. March statistics showed a further reduction in stocks. Despite this gradual statistical improvement, the market dropped five points. Most smelters are not willing to sell very much metal at the new low price.

Lead—Buying has picked up for prompt and May shipment but prices are unchanged.

Tin—When the price broke almost to 25.00c about a week ago, consumers and dealers came into the market for the largest tonnage they have taken in more than a month. But the market lapsed into quietness again and does not appear very firm. Consumption of tin has improved more than use of other metals, but stocks continue to accumulate in England, with little change elsewhere. It is possible that present world mine curtailment will force production of refined metal lower and thus bring about a stronger statistical situation.

Aluminum—Light buying continues and new metal prices are unchanged. Secondary metal of high grade is fairly firm.

Coke By-Products Prices Steady; Output Curtailed

New York—Benzol and toluol lead in demand among distillates at unchanged prices. More benzol is moving at 20.00c, although some lower grades go at 19.00c. Solvent naphtha and xylol are unchanged. Phenol buying continues irregular with the bulk of material moving at 17.00c. Naphthalene spot demand is holding well with minimum quotations on both flakes and balls generally firm. Sulphate of ammonia is unchanged with domestic demand holding well. Coke oven operations continue curtailed.

Coke By-Products

	Spot
Per Gallon, Producers' Plants, Tank Lots	
Pure benzol	$0.19 to 0.20
90 per cent benzol	0.19 to 0.20
Toluol	0.27
Solvent naphtha	0.25
Commercial xylol	0.25
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.16 to 0.17
Per Pound at Producers' Plants	
Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.85 to $1.90

Quicksilver Is Easy

New York—Quicksilver is quiet and slightly easy at $100 to $102 a flask.

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead New York N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
April 8	9.75	10.00	9.50	25.47½	25.80	4.50	4.25	3.90	22.90	6.95	35.00
April 9	9.75	10.00	9.50	25.95	26.25	4.50	4.25	3.90	22.90	6.95	35.00
April 10	9.87½	10.00	9.50	25.80	26.12½	4.50	4.25	3.85	22.90	6.90	35.00
April 11	10.00	10.12½	9.50	25.62½	25.95	4.50	4.25	3.85	22.90	6.90	35.00
April 13	10.00	10.12½	9.50	25.55	25.90	4.50	4.25	3.85	22.90	6.87½	35.00
April 14	10.00	10.12½	9.50	25.70	26.00	4.50	4.25	3.80	22.90	6.87½	35.00

Europe

European Markets Continue Depressed—British Steel Output Down—Soviet Buys Shapes

London—(*By Cable*)—Steel and iron markets in Britain are stagnant following the Easter holidays. The London & North Eastern railroad has placed 40,000 tons of rails. Steel business in the Middlesbrough district has improved slightly, but Sheffield is feeling the full force of the depression, lacking railroad, shipbuilding and armament orders. Continental steel bars are available at £5 ($24.30), delivered, Birmingham.

Pig iron production in Great Britain in March totaled 355,000 tons, a daily average of 11,451 tons, compared with 11,435 tons in February and 10,877 tons in January. The number of stacks active at the close of March was unchanged at 81. Output of steel ingots and castings in March was 505,000 tons, a daily average of 16,290 tons, against 17,371 tons in February.

Conditions on the Continent show little change. STEEL's correspondent at Berlin reports a better sentiment and increasing inquiries for export. Scandinavia and Holland are placing orders. Some rails and concrete bars are being shipped to the United States. Russia has purchased 25,000 tons of structural steel.

Railroad Orders Help British Steel Situation

Birmingham, Eng.—The March returns of exports from the Tees show one of the biggest shipments of iron and steel for nearly a year. Cargoes of nearly 10,000 tons, consisting mostly of steel rails, were shipped at the end of the month to South Africa. Although orders have fluctuated a great deal it is believed the month's export figure is above the average.

The Southern Railway Co. will shortly place orders for 32,000 tons of steel rails and 5000 tons of steel sleepers. This is a repetition of an experimental order given two years ago which has proved satisfactory. The Great Western Railway Co. will lay 62,000 steel sleepers this year. It already has 136,000 steel sleepers laid in the permanent way. Orders for the steel have been placed with Guest Keen & Nettlefeld, Workington Steel Co., United Steel Co., Dorman Long & Co. and the Ebbw Vale Co. The Great Western Co. has already announced that it proposes to spend 8½ million pounds and this year will probably require some 90,000 tons of British steel.

Dorman Long & Co. has taken a contract for a bridge over the Tees at Newport. It is not known how much steel will be required, but the cost is estimated at about £436,000.

Midland Activity Slackens

Demand for steel in the Midlands is stagnant and there is much idle plant in the district. Steel for the automobile factories was bought a week or two ago but demand from this source has subsided on the approach of the Easter holiday. Structural work is confined to small tonnages and rolling mills have no orders for second quarter.

Last week 900 tons of steel billets and bars from the Continent were unloaded in the Tees. On the Birmingham exchange yesterday there was a definitely firmer tone in prices quoted for Continental semis. This is not due to increase in demand but rather to the cessation of some works on the Continent as a result of which less material is available for export.

Prices Gain Slightly

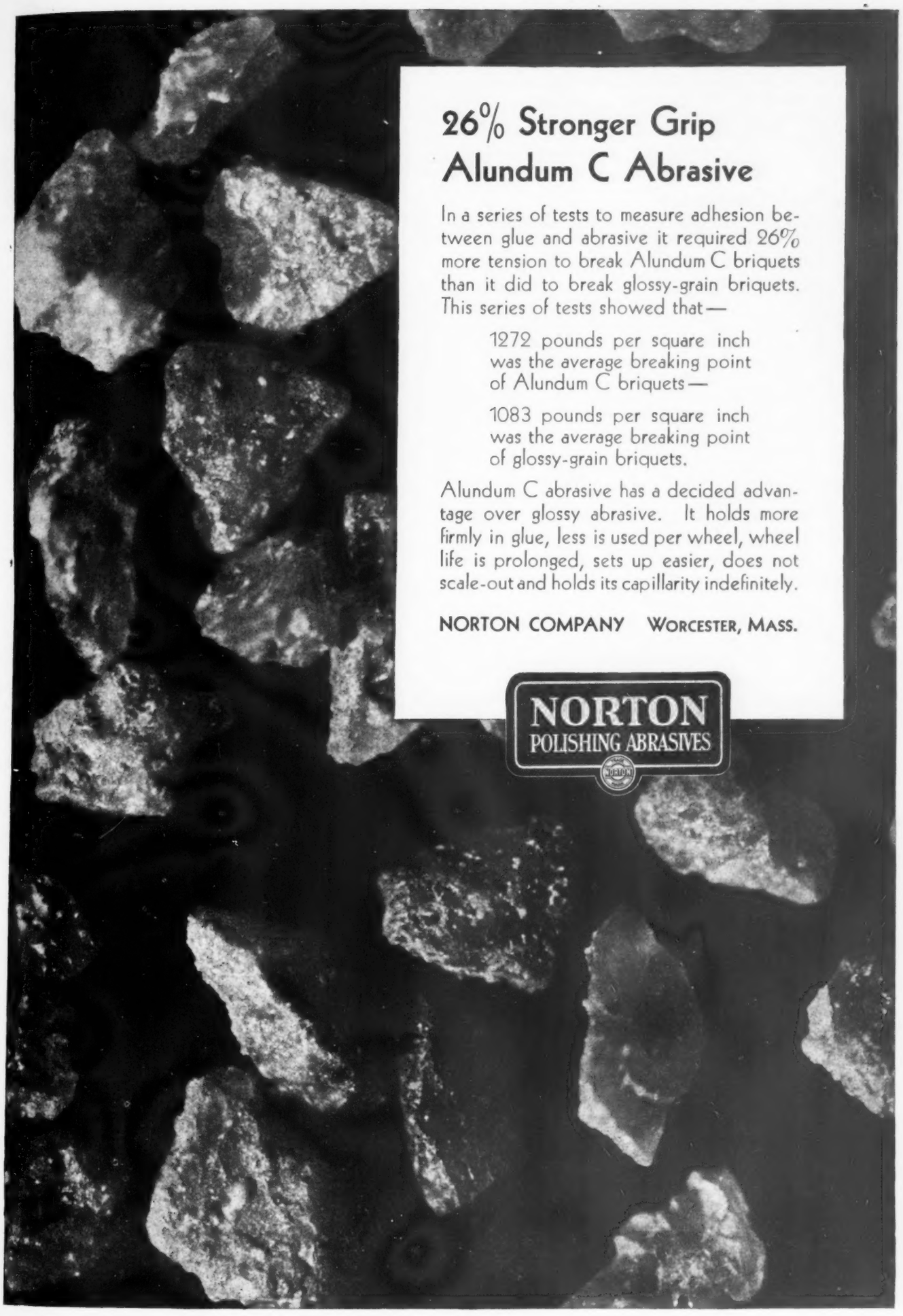
Birmingham merchants realize that in these circumstances it would need only a mild buying movement to bring an upward turn in foreign prices. For 2-inch billets they quote £4 7s delivered, against £4 5s a week ago and for small steel bars £4 18s was a common price, this also showing a slight increase in the same period. The rerollers are short of work and as they have so much material in stock they are not interested in Continental fluctuations.

An advance of tin has been followed by a firmer tone in the Welsh tin plate market where plates are selling at 15s 9d ($3.82) to 16s ($3.88). Second hands can be obtained at slightly less. A report is circulating in the Swansea market that a heavy order for Welsh tin plate has been placed by the Soviet

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, April 13	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f.o.b. Ship at Port of Dispatch—By Cable								
PIG IRON		£ s d		£ s d		£ s d		£ s d
Foundry No. 3**.....	$14.22	2 18 6*	$11.91	2 9 0	$11.91	2 9 0	$12.15	2 10 0
Basic-bessemer..	14.58	3 0 0†	11.54	2 7 6	11.54	2 7 6	13.37	2 15 0
Hematite, Phos. .02-.05	16.28	3 7 0	.....	.....	.....	.....	17.01	3 10 0
SEMIFINISHED STEEL								
Billets	$26.12	5 7 6	$16.28	3 7 0	$16.28	3 7 0	$16.04	3 6 0
Wire rods.....	41.31	8 10 0	29.16	6 0 0	29.16	6 0 0	29.16	6 0 0
FINISHED STEEL								
Standard rails	$40.10	8 5 0	$31.59	6 10 0	$31.59	6 10 0	$31.59	6 10 0
Merchant bars	1.68c	7 15 0	.85c	3 17 0	.85c	3 17 0	.86c	3 18 0
Structural shapes.....	1.68c	7 15 0	.75c	3 8 6	.75c	3 8 6	.78c	3 11 0
Plates	1.79c	8 5 0	.96c	4 7 6	.96c	4 7 6	1.02c	4 13 0
Sheets, black, 24 gage	1.90c	8 15 0	1.80c	8 4 0	1.80c	8 4 0	1.94c	8 16 0
Sheets, gal., 24 ga. corr.	2.71c	12 10 0	2.23c	10 2 6	2.23c	10 2 6	2.31c	10 10 0
Bands and strips	2.06c	9 10 0	.96c	4 7 6	.96c	4 7 6	.99c	4 10 0
Plain wire, base	2.06c	9 10 0	1.10c	5 0 0	1.10c	5 0 0	1.10c	5 0 0
Galvanized wire, base..	2.39c	11 0 0	1.46c	6 12 6	1.46c	6 12 6	1.38c	6 5 0
Wire nails, base	2.39c	11 0 0	1.13c	5 2 6	1.13c	5 2 6	1.16c	5 5 0
Tin plate, box 108 lb...	$ 3.77	0 15 6	.....	.....	.....	.....	$ 8.26	1 14 0
Domestic Prices at Works or Furnace—Last Reported				French Francs		Belgian Francs		Renten Marks
Fdy. No. 3 Pig Iron**	$14.22	2 18 6	$11.93	305(2)	$12.78	400	$18.58	78
Basic pig iron.....	14.58	3 0 0	12.74	325(1)	11.95	430	20.37	85.50
Furnace Coke.....	2.92	0 12 0	6.19	158	5.00	180	5.10	21.40
Billets.....	26.12	5 7 6	19.21	490	17.24	620	26.32	110.50
Standard rails.....	1.79c	8 5 0	1.41c	785	1.57c	1,210	1.37c	127
Merchant bars.....	1.68c	7 15 0	.94c	520	.88c	680	1.38c	128
Shapes.....	1.90c	8 15 0	.99c	550	.86c	665	1.35c	125
Plates.....	1.95c	9 0 0‡	1.26c	700	1.03c	790	1.58c	147
Sheets, black, 24 gage	1.90c	8 15 0	2.21c	1,230	2.34c	1,800	1.26c	117
Sheets, gal. 24 ga., corr.	2.39c	11 0 0	2.66c	1,475	2.73c	2,100	3.56c	330
Plain wire.....	2.06c	9 10 0	1.98c	1,100	2.15c	1,650	2.24c	207
Bands and strips.....	2.06c	9 10 0	1.23c	685	1.27c	975	1.60c	148

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 12s 0d ($2.92) f. o. b. Ferromanganese £16 9s 0d ($79.95) delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f. o. b.; **Silicon 2.50-3.00. British quotations are for basic openhearth steel. French, Belgian, Luxemburg, and German are for basic-bessemer steel.


26% Stronger Grip
Alundum C Abrasive
In a series of tests to measure adhesion between glue and abrasive it required 26% more tension to break Alundum C briquets than it did to break glossy-grain briquets. This series of tests showed that—
1272 pounds per square inch was the average breaking point of Alundum C briquets—
1083 pounds per square inch was the average breaking point of glossy-grain briquets.
Alundum C abrasive has a decided advantage over glossy abrasive. It holds more firmly in glue, less is used per wheel, wheel life is prolonged, sets up easier, does not scale-out and holds its capillarity indefinitely.
NORTON COMPANY WORCESTER, MASS.
NORTON
POLISHING ABRASIVES

government. General demand is not sufficient to keep mills operating more than about 50 per cent of capacity. It is generally agreed that the bottom of the market has been reached in regard to price and makers are looking for a turn upward with even a slight increase in demand.

France Feels Depression in Steel Markets

Paris—While French heavy industries have not yet suffered to the same extent as those of other countries, there is no doubt that trade depression continues to grow in France and that there is no sign of this tendency changing soon. The position of France in international markets is weakening, and the deficit in the commercial balance now attains 2,550,000,000 francs for January and February (this does not take account of invisible exports). Particularly in the iron and steel heavy industries export trade is unsatisfactory, notwithstanding the slight improvement which recently was registered. Railroad receipts also are decreasing, and the country now is beginning to experience difficult times.

The price of pig iron in the domestic market has risen, due to the decision taken by the Hauts-Fourneaux de Saulnes to increase its prices. Foundry pig iron, 2.5 to 3 per cent silicon, now is quoted at 305 francs ($11.90) at works, against 285 francs ($11.10) previously. The tonnage of hematite pig iron alloted to foundries for second quarter is 50,000 metric tons, the same as during the first quarter.

The price of merchant steel appears to have been stabilized for the time being, but, of course, it is realized that it has reached a low level. Reinforced concrete bars and heavy angles are quoted at 450 to 470 francs ($17.55 to $18.40), and merchant bar prices range from 470 to 500 francs ($18.40 to $19.50).

A favorable sign is that a number of jobbers and warehouses have passed orders to refill their depleted stocks. The plate syndicate finds no difficulty in maintaining its basis price of 700 francs ($27.35) per ton for 5-millimeter basic bessemer plates. The wire products market is weak.

Britain Makes Less Steel

London—Production of pig iron in Great Britain in February was 320,200 gross tons, compared with 337,200 tons in January, and 607,000 tons in February, 1930.

The February output of steel ingots and castings was 486,400 gross tons, against 402,200 tons in January, when production was affected by New Year holidays in some districts, and 776,400 tons in February, 1930. Comparisons follow, in gross tons:

Mon. ave.	Act. Fur. on last day	Pig iron	Steel ingots and castings
1913	338*	855,000	638,600
1928	132	550,800	710,000
1929	162	632,400†	803,000†
1930	76	516,400	608,200†
1931			
Jan.	83	337,200	402,200
Feb.	81	320,200	486,400

(*) Average for year.
†Revised figures.

German Steel Tonnage Up

Berlin—The output of pig iron in Germany in January was the lowest recorded since November, 1928, during the Ruhr strikes.

Output of steel ingots and castings in January amounted to 772,776 metric tons, against 743,679 tons in December, 1930. The output of finished steel in January amounted to 539,850 metric tons, compared with 533,029 tons in December, 1930. Figures are as follows, in metric tons:

Mon. ave.	Furnaces on last day	Pig iron	Steel ingots and castings	Finished steel
1913*	204	910,000	993,000	970,000
1928	101	985,000	1,210,000	881,000
1929	95	1,117,000	1,354,000	940,000
1930	63	808,000	962,000	679,000
1931				
Jan.	61	603,104	772,776	539,850

*In present boundaries.

French Production Lower

Paris—Output of pig iron in France in January was 803,000 metric tons, compared with 806,000 tons in December, 1930. Output of steel ingots and castings in January was 746,000 metric tons, compared with 766,000 tons in December, 1930. Figures follow:

Mon. ave.	Iron ore	Pig iron	Steel ingots and castings
1913	3,588,000*	756,000*	581,000*
1928	4,094,000	832,000	792,000
1929	4,220,000	864,000	808,000
1930	4,038,000	841,000	783,000
1931			
Jan.	3,805,000	803,000	746,000

*In present boundaries.

Steel Entente Seeks New Control By Penalties on Excess Exports

ONLY one decision actually was made at the meeting of the European steel entente at Dusseldorf in March. This was to maintain unchanged the quota of production of member countries for the whole of the second quarter. This quota, on the present basis of calculation, works out at between 2,200,000 and 2,340,000 metric tons per month, the aggregate monthly output allowed for Belgium, France, Germany, Luxemburg and the Saar.

The meeting, however, was particularly interesting, owing to the advance made in negotiations for reorganization of the entente, which, under present conditions, is to be renewed July 1. The main idea is to set up organizations which will permit control of export tonnage and enable export prices to be maintained at an economic level. It will be recalled that a year ago members of the entente organized a number of selling syndicates, but these attempts at organizing export markets failed.

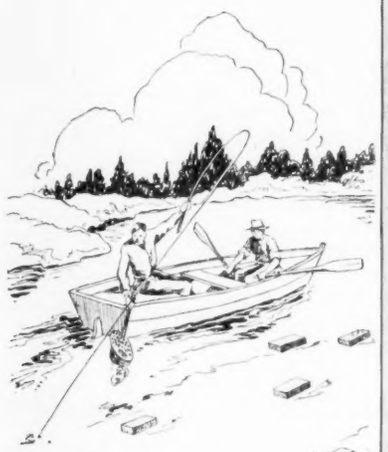
At the recent Dusseldorf meeting a tentative scheme was put forward by Luxemburg representatives and was accepted in principle. The basic idea is, that instead of fixing a definite quota of production to be divided between the member countries for a given period, as is now being done, it is proposed to break up the market of the prospective member countries into two main divisions, domestic and export. A quota would be allocated to each member country, which would apply to the tonnage which it would be permissible for each country to export without incurring a penalty.

Concurrently with this allocation of export quotas, a quota also would be allocated for the domestic market, but insofar as the domestic markets would be concerned there would be no sanctions. The fixing of the quota for the domestic market would, however, be of interest because it would work in the following way: In the event of a country exceeding its export tonnage quota, but not reaching its quota for domestic sales, it would be possible to alleviate the sanctions imposed on the infringement of the export tonnage quota by making an allowance for not having attained the limit of domestic sales. This particular point is at present somewhat obscure, but the whole scheme presents a certain elasticity which did not obtain in the methods adopted in the past.

The main advance made during the Dusseldorf meeting is that the principle of breaking up the markets between domestic and export tonnage answers to the wishes and seems to meet the requirements of the interested parties, and has been adopted as a basis for further negotiations.

A Brick *lighter than water!*

THIS INSULATING BRICK DOES A FULL JOB IN ANY HIGH TEMPERATURE FURNACE



Photograph showing Nonpareil Brick floating in 4 inches of water.

HAVE you ever seen a brick float? Two fishermen did recently. They couldn't believe their eyes! A furnace had been torn down upstream from where they were fishing, and the old brick was thrown into the river. Most of the material sank. But the Nonpareil Insulating Brick used in the job floated on top of the water!

This light weight means just one thing: Armstrong's and Nonpareil Insulating Brick are composed of thousands of tiny, air-tight cells. These cells stop the passage of heat. Both brick provide efficient insulation for high temperature work.

Machine-sized for accuracy

Consider some of the other advantages that Armstrong's and Nonpareil Insulating Brick offer. Each brick is machine-sized for accuracy—to within .004 of an inch, as shown by recent tests. Your mason will appreciate the fact that there are no "shorts," no "overs" with these brick. Cost of laying is less, time is saved, and a more heat-tight job assured.

Structural strength

In spite of light weight these brick have great structural strength. Each supports many times its own weight in free construction. No matter how large or tall the furnace, Armstrong's and Nonpareil Brick have an ample factor of safety. Moreover, they have been reclaimed for re-use in many instances.

These are the reasons why many mills have found that Armstrong's and Nonpareil Insulating Brick save money. They cut down on fuel bills by 10% to 40%. We will gladly give you facts and figures to prove this statement. For further information and a sample brick, write to Armstrong Cork & Insulation Co., 920 Concord Street, Lancaster, Penna.

Armstrong's (A) *Product*

TWO BRICKS . . .
TWO JOBS . . .

Burned at Cone 14, Armstrong's Insulating Brick will withstand temperatures up to 2500° F. behind the refractory without fusing, cracking, or spalling.

Nonpareil Insulating Brick is used for temperatures up to 1600° F. back of the refractory.

Both are machine-sized for accuracy. Both come in standard bricks, with special shapes and sizes supplied on request.

Armstrong's and Nonpareil Insulating Brick

for FURNACES, OVENS, KILNS, and LEHRS

Machinery

OPINIONS as to present conditions and early prospects in the machine tool industry are apt to be colored by the immediate state of mind of the individuals being queried. A relatively small order is enough to make an optimist of the average machine tool man these days, and the loss of a small order will make him equally pessimistic. Thus minor fluctuations become magnified, giving the equipment market appearance of much greater instability than actually exists. A common denominator reduced from many reports indicates that conditions for machine tool business gradually are improving, even though orders still are elusive.

New York—Machine tool buying and inquiry are spotty. Some dealers and builders report a fair volume, but April thus far has failed to bring about any general improvement. Railroads are buying much equipment. Textile machinery buying has improved slightly. Most purchases appear to be for replacement, plant expansions being few. Russian interests continue to call for a fair volume of industrial equipment. Inquiry has slackened on the part of some who were the best buyers of earlier this year, these apparently having by now been tooled up to meet any immediate needs. In view of the existing state of affairs most dealers have ceased to expect a sustained revival in the machinery business before next fall.

Worcester, Mass. — Spotty conditions still prevail here in the machine tool business. Lathe and drill manufacturers are being kept fairly busy turning out what machines they still have on order for Russian interests. Grinder manufacturers practically have completed their Russian orders which were mentioned several weeks ago.

Some acceleration is being given to the market by recovery in the textile industry, Crompton & Knowles Loom Works having recently opened negotiations for machine tool equipment. Textile machinery makers continue as they have been for several months, in relatively the strongest position of any in the machinery industry.

Some railroad orders have been booked but no substantial buying schedules have become evident in that direction. Several orders for saws have been placed with Worcester builders.

Pittsburgh — Sentiment alone is improving in the machine tool market. Awards and inquiry continue slow but sellers show more optimism regarding coming months. Small lots predominate in orders and inquiry, with little change revealed from the rate of recent weeks. Activity is fairly well diversified among various industries despite its quiet character.

Cleveland—Sufficient signs of improvement in some of the important machine tool using industries are apparent to encourage the sales managers of machine tool companies to continue rather active campaigns launched early in the year. Although but few really worthwhile orders have been reported as direct results of these campaigns, there is a general feeling the advantages of new designs, which have been so numerous of late, have been sold to users to such an extent that comparatively mild increases in production demands will precipitate equipment orders of substantial character.

Among prospects whose present condition is favorable enough to hold forth hopes for equipment orders, the electrical refrigeration industry is receiving particular attention by several well informed machine tool builders. Model changes to meet new refrigeration technique and also to meet keen competition within the industry, make new machine tools desirable even though no expansion of manufacturing facilities is contemplated.

Materials handling equipment holds the center of the stage this week, with widespread attention focused upon it by the second national industrial equipment congress and exposition under way at the Cleveland auditorium.

Chicago—Union Pacific railroad has issued a list of 20 miscellaneous items, including a 16-inch lathe. The list of 43 items sent out by Chicago, Milwaukee, St. Paul & Pacific largely is electrical equipment, specialties and portable tools. The list includes six grinders, two of which are of the heavy-duty double floor type, a 32-inch draw cut shaper, a 5-foot radial drill, a 20-inch drill press, various types of saws, a car wheel stripping press, a burnishing lathe, a 42-inch wheel borer and other miscellaneous items. Santa Fe will buy a No. 2 motor-driven drill press with tapping attachment.

Woodworking tools and electric drills will be purchased by the Chicago board of education for the Foreman, the Sullivan and the Hubbard Junior high schools and the Bell school. Industrial inquirfes generally are extremely scarce. A tractor manufacturer in the Milwaukee district has just closed on a $35,000 order, and an excavating machinery manufacturer will buy two radial drills and a planer. Some hope is held forth by programs reported to be planned by several of the large tractor makers for release late in the summer or early autumn. It is probable the Senn high school inquiry will be out in about ten days. This will include a dozen or more items. April sales thus far have been lighter than those of the corresponding period in March, according to most dealers.

Machine Tool Industry Will Receive Radio Salute

Recognition by a large machine tool user of the basic importance of the machine tool industry in this age of machinery will be given in the Westinghouse radio salute to machinery builders, to be broadcast over a chain of 25 stations associated with the National Broadcasting Co., Sunday, April 26, at 9.45 p.m., eastern standard time.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., sponsor of the program, announces that it will be based upon one of the fundamentals of American industrial supremacy—the great strides which have been made, and still are being made, in the use of machinery in this country.

Carl A. Johnson, president, National Machine Tool Builders' association, Cincinnati, will be guest speaker and will emphasize the importance of constant improvement in machinery in maintaining and increasing industrial prosperity. The Westinghouse ensemble, directed by Zoel Parenteau, will furnish music interpreting mechanical progress.

Drop in Freight Car Needs

Trans-Missouri-Kansas shippers' advisory board, covering Missouri, Kansas, Oklahoma, Arkansas and southern Illinois, estimates freight shipments of basic commodities during second quarter will show reduction of 8.5 per cent below second quarter, 1930.

Steel Angles from Chicago

(*Concluded from Page 25*)

winds up pending orders, except odd lots and repair work.

Car shops are content to await developments, for a general optimism exists as to the likelihood of important equipment purchases late this year. Several of the car building plants have their foundries producing one to two heats a day for repair parts.

Northern Pacific railroad is well launched into its freight car rebuilding program, which is on schedule at the road's own shops. This is the largest rebuilding program ever undertaken by that road. More than 3000 cars are being rebuilt at a cost of about $4,500,000. Siems-Stembel Co., St. Paul, and Pacific Car & Foundry Co., Seattle, will supply the parts for the Northern Pacific's St. Paul and far west shops. About 10,000 tons of finished steel is being purchased for the entire program.

Pullman Reflects Losses in Passenger Earnings

March was without passenger car orders, as were January and February. Freight car orders during first quarter numbered 2190, against 27,027 in first quarter, last year.

Illustrative of passenger traffic losses is the Pullman 1930 financial report, which shows the $4 dividend covered, not by passenger business but by the car building subsidiaries, even in a meager car building year.

The outstanding feature of last year was that the manufacturing subsidiaries contributed over 59 per cent of total Pullman earnings, compared with 35 per cent in 1929, and thus were the sustaining factor in the 1930 showing. Compared with the relatively favorable showing of car building activity is an abnormally low level of traffic earnings in the business of the common carrier subsidiary.

While lean in comparison with old-time car building seasons, which some say never will be matched in a single year again, 1930 is set down as a fair year in rolling stock equipment production, while 1928 was one of the leanest car construction years since the roads were turned back to private control after the war-time federal government operation.

◆

Western railroads are none too hopeful about business recovery in the second quarter. They are continuing to develop bus transportation in a big way, and the paring down of operating costs. An all-day meeting of 17 of these carriers in Chicago recently resulted in the groundwork of an organization to improve the showing from passenger business in western territory. An interstate commerce commissioner was in the conference.

The idea was to reduce passenger expenses, which it is contended, have been maintained out of all proportion to the decrease in passenger revenues. It was the concensus that substantial savings in passenger expenses can be effected through reductions of mileage on noncompetitive routes and pooling of services on highly competitive routes.

◆

Chicago & North Western and Union Pacific, jointly owning the Interstate Transit Co., a bus subsidiary, operate 450 busses, which are replacing gradually the unprofitable local trains on the two rail lines.

In the past year, Chicago & North Western has made important bus service developments in Iowa, where the road has purchased a number of feeder routes, and the Union Pacific in Nebraska and the Utah park district.

Southern Pacific has invested nearly $16,000,000 in bus and pipe lines, including a third interest in the Associated Pipe Line Co. That road now owns outright 15 motor transportation corporations, with a substantial interest also in another trans-continental bus line.

The roads have been advised by their advisory boards that they may expect a marginal decrease in second quarter freight loadings in the central western region, compared with second quarter, 1930. Farm implement loadings are expected to be off 31.2 per cent.

The Great Lakes Regional shippers' advisory board, however, estimates that car requirements will gain 3 per cent over first quarter, due largely to seasonal road materials, ore and grain crop movements. Second quarter estimates include iron and steel, 55,000 cars; ore, 101,000 cars; petroleum, 22,000 cars; farm implements, 2530 cars; and automobiles and parts, 100,396 cars.

Tank and Refrigerator Cars Go into New Lineup

News of the sale of Swift & Co.'s fleet of tank and stock cars to General American Tank Car Corp., and their subsequent return to Swift under lease raises the question as to whether the purchase of refrigerator cars and food products rolling stock in the future may be centered in the hands of some of the specialized car builders.

Rumors also have been noted that General American will buy the Wilson, Cudahy and Armour fleets, embracing thousands of additional cars for food products and stock. Armour and Swift had operated about 14,000 refrigerator cars alone.

The development is the first under which the packers have started plans for the handling of food products other than meats following a more liberal modification of the packers' consent decree by the United States Supreme Court. According to some views, this may be an impetus to new refrigerator car building.

Loss of the tank car companies' business to the cross-country pipe lines may not be as serious as is generally supposed. Agitation sponsored by the railroads some time ago that the petroleum industry divest itself of its tremendous investment in oil pipe lines, of course, will be opposed.

It is contended that at least two more years of heavy main line pipe business is in sight, and following that several years of a substantial volume of orders for gas feeder and distributing lines is seen. One of the important outlets for the pipe line industry is the possibility existing for much heavier transportation of gasoline and refined petroleum products.

General American's original activity was in petroleum products. The management asserts that gasoline now accounts for less than 10 per cent of the entire transportation business of the company, and that in the near future 60 per cent of its cars will transport food products.

Soviet Tractor Orders Not Regarded as Profitable

Tractor deliveries for soviet Russia against orders placed last year, now are being completed. Virtually all are off the assembly lines. The western tractor builders were not entirely happy with the Russian accounts, although they helped reduce inventories and furnish additional production during a dull period. As only 50 per cent was paid down and the remainder distributed over a period of years, the orders were not immediately of substantial profit.

Largely through the tractor orders, soviet Russia bought more goods in Illinois than in any other two states in this country during 1930, according to an official of the Amtorg Trading Corp. The Illinois share totaled more than $38,000,000, chiefly in the Chicago district. This amount was double the total for 1929. In Illinois, Michigan, Wisconsin and Ohio Amtorg placed orders for $72,000,000 worth of goods in 1930, the total for the United States being $150,000,000. Soviet purchases in Illinois were largely tractors, combines, farm tillage tools, conveying and mining equipment and foundry supplies. More than 600 firms in the four states received Russian orders last year.

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

BRIDGEPORT, CONN.—Acme Mfg. Co. has started the manufacture of brass faucets and plumbers fittings. Operations require 15 employes.

HARTFORD, CONN. — Chamber of commerce will lease to Interstate Airways Inc., a 100 x 120-foot hangar with shops, to be built at a cost of approximately $35,000. I. A. Allen & Son Inc., 100 Farmington avenue, architect, is preparing plans. Equipment will be needed.

BOSTON—South Boston Iron Works, 633 East Fourth street, South Boston, is a new company, manufacturing architectural iron products.

READING, MASS.—Department of public works will expend $50,000 for construction of a pumping station near Grove street. Weston & Sampson, 14 Beacon street, are engineers.

WORCESTER, MASS. — Department of public works will receive bids for a 3-story shop to be built on East Worcester street at a cost of $150,000. Unit will be 50 x 175 feet. R. G. Gorrani, 175 Green street, is architect.

PORTLAND, ME. — Portland water district will award contract for a pumping station to be built on Walnut street. J. C. and J. H. Stevens, 711 Chapman building, are engineers.

NEWPORT, N. H.—City, H. E. Jameson clerk, proposes erection of a hangar at a municipal airport to be developed. Cost is estimated at $55,000.

NEWPORT, R. I.—Bureau of supplies and accounts, navy department, Washington, will receive bids April 21 on schedule 5484 for one 36-inch band saw.

New York

BROOKLYN—Bureau of supplies and accounts, navy department, Washington, will receive bids April 21 on schedule 5485 for one electric heat treating furnace, on schedule 5491 for one motor-driven riveting machine; bids will be received April 28 on schedule 5536 for one generator, 410 kilowatts, 240-325 volts, direct current, 700 revolutions per minute.

LOCKPORT—Wille Mfg. Co. has been incorporated with $20,000 capital by Maynard G. Hess and F. Roy Wille, to do a general brazing and welding business.

LONG ISLAND CITY—Plant of Modern Lighting Fixture Co. Inc., 353 Fourth avenue, recently was damaged by fire.

LONG ISLAND CITY—Department of water, gas and electricity, municipal building, New York, plans to build a 2-story shop, 52 x 150 feet, at Dryer and Packard streets. Cost will exceed $50,000. D. Campbell of the department is architect.

NEW YORK—American Cut Clamp Machine Co. has been incorporated with $10,000 and 500 common shares by A. Baumgarten, 1450 Broadway.

NEW YORK—New England & Western Airlines Inc., operating Holmes Airport Inc., Jackson Heights, advises that hangar to be constructed is an airship dock for the housing of dirigibles. Contract has been awarded to Austin Co., 16112 Euclid avenue, Cleveland. Structure will be 88 x 200 feet. (Noted April 2.)

New Jersey

BORDENTOWN—Department of institutions and agencies, state house annex, Trenton, N. J., has plans for the construction of a 2-story industrial school here. Guilbert & Betelle, 20 Branford place, Newark, N. J., are architects. Cost is estimated at $150,000. (Noted Dec. 18.)

NEWARK—Art Metal Works Inc., 7 Mulberry street, has filed plans for a plant addition. Cost is estimated at $175,000.

PERTH AMBOY—City council proposes to extend and improve the municipal light and power plant and install equipment.

Pennsylvania

CONSHOHOCKEN — Plant unit of John Wood Mfg. Co., manufacturer of septic tanks and testing motors, recently was virtually destroyed by fire. Loss is estimated at $50,000.

PHILADELPHIA—Edelco Mfg. Co. has been incorporated with $10,000 capital by Henry Edelman, 612 West Olney avenue, to design, manufacture and sell plumbing supplies and appliances.

PHILADELPHIA — A. J. Reed Co. Inc. has been incorporated with $5000 capital by Arthur J. Reed, School lane and Wissahickon avenue, to manufacture and sell heat and other control apparatus, thermostats, blowers and other equipment.

PITTSBURGH—Walter J. Kretz Inc. has been incorporated with $5000 capital by Walter J. Kretz, 3322 East street, to manufacture and deal in ventilators, furnaces and boilers.

PITTSBURGH—Binns Mfg. Co. has been incorporated with 1000 no par shares by H. Kenelm Binns, 5410 Plainfield street, to manufacture and sell articles of iron, steel and brass.

READING—J. H. Armitage Co. Inc. has been incorporated with 60 no par shares by C. H. Contos, 1247 Perkiomen avenue, to manufacture tools, parts, machines and apparatus.

SOUTH TEMPLE—Moore Body Co. has been incorporated with 5000 no par shares by Walter J. Hansen, 932 Hamilton place, Wyomissing, Pa., and John N. Budde, 366 Myrtle avenue, Irvington, N. J.

WYNCOTE — Philadelphia Electric Co., Philadelphia, has started preliminary work on construction of a service building here. Unit will include shops for repair of meters, operating machinery and appliances. Total cost is estimated at $400,000. John T. Windrim, Commonwealth boulevard, is architect and contract is held by United Engineers and Constructors Inc., 112 North Broad street.

Ohio

CLEVELAND—Plant of Forrest Mfg. Co., manufacturer of toy pistols, recently was damaged by fire. Loss, principally to stock, is estimated at $20,000. Small loss also was sustained by Radio Tool & Die Co., same address.

COLUMBUS—Board of trustees of Ohio State university, Carl E. Steeb secretary, will purchase a 4000-kilowatt turbogenerator and a 5000-square foot horizontal two-pass condenser.

FRANKLIN—City, J. T. Riley mayor, proposes erection of a municipal light and power plant. Plans are being prepared by Burns & McDonald Engineering Co., Interstate building, Kansas City, Mo.

FREDERICKTOWN—Edwards Sheet Metal Works, W. E. Edwards owner, recently suffered loss from fire damage. Company manufactures corrugated iron culverts and pipes. Loss is estimated at $20,000.

TOLEDO—Irvin Swedler proposes to build a plant at 816 Ontario street on a site 50 x 150 feet, for the manufacture of airplanes. Cost is estimated at $25,000.

Indiana

INDIANAPOLIS—Plant of Richards-Wilcox Co., hardware manufacturers, at 1939 North Meridian street, recently was damaged by fire, with small loss.

INDIANAPOLIS—C. C. Shipp & Co. Inc. has been incorporated with $25,000 capital by C. C. Shipp, 3405 Guilford avenue, to manufacture iron, steel, manganese and other metals.

KOKOMO—Milrick Corp. has been incorporated with 2000 no par shares by J. E. Frederick and Benjamin Mills, to deal in machinery.

SHELBURN—A. Patten, formerly of Terre Haute, Ind., has taken plant space in the Lane building for the manufacture of automobile accessories.

Michigan

DETROIT—National Stamping Co., 617 Glover street, has let contract to W. J. C. Kaufmann Co., 10610 Shoemaker street, for erection of a plant unit at Fort and Glover streets. Cost is estimated at $8000.

DETROIT—Safety Electrical Appliances Inc., 2700 Franklin street, has been incorporated with 25,000 no par

and

discuss

DUAL CONTROL OF WELDING HEAT

"One of our welding men told me that no operator could do good work unless he had dual control of his welding heat. What does that term mean?"

"It means to the operator what your gear shift and accelerator mean to you as an automobile driver. You get major speed variation by your shift and refinement of the speed by your accelerator."

"You mean that you can get proper welding current at the right welding voltage throughout the range of the machine in two ways?"

"Exactly, and what that operator means is that he can't do as good a job of welding or as fast a job of welding, without this dual control."

"Sounds reasonable. I wouldn't buy an automobile that hadn't both gear shift and accelerator. See that our new machines have that improvement.

"They will, if we buy Lincoln 'Stable-Arcs'. Because of this feature they are the only welders that give the full capacity of the machine at the voltage required for 'Shielded Arc' welding. It's an exclusive development of

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Does NOISE cost you money?

PRODUCTION experts have proved that irritating shop noises increase the workers' fatigue, and *cut down production.*

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Do your motor-driven hammers broadcast a gear shriek that can be heard a block away?

Or are you using the ERIE Motor-Driven Board Drop? *The low hum of its gears cannot be heard above the ordinary noise of the forge shop!*

QUIET that means Bigger Production . . . Reliability . . . Economical Operation

ERIE gears are cut by a generating process, from forged steel, assuring accurate tooth form. They run at very moderate pitch line speeds—maximum about 1,000 feet per minute. All gears are enclosed in heavy cast-steel gear case, and *operate in a bath of oil.*

Write for Bulletin describing the ERIE Motor Driven Board Drop Hammer.

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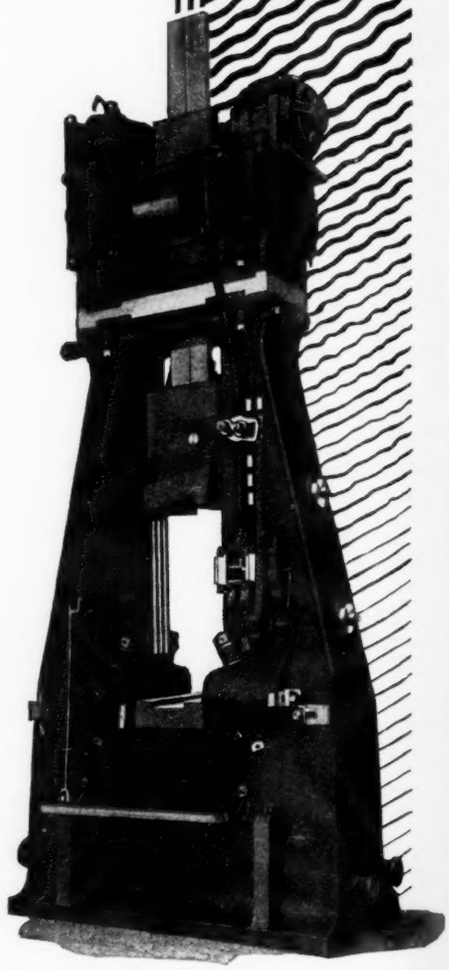

The unrivalled Quietness of this better-built motor driven hammer assures you of Lower Upkeep Cost and Greater Production— with Higher Labor Efficiency as an added advantage.

shares by Winfield S. Grant, 610 Marquette drive, to manufacture and deal in electrical appliances.

Illinois

CHICAGO — Commonwealth Edison Co., 72 West Adams street, has a building permit for erection of a 62 x 85-foot substation at 1034-58 Western avenue north. H. H. Von Holst, 20 West Wacker drive, is architect. Cost is estimated at $70,000.

CHICAGO — Bell & Howell, 1803 Larchmont avenue, will build a plant addition, 108 x 151 feet, at a cost of about $36,000. Pond & P. D. Martin & Lloyd, 180 North Michigan avenue, are architects. Contract is held by Schmidt Brothers Construction Co., 22 East Huron street. Company manufactures motion picture machines.

Southern States

WASHINGTON—Department of agriculture will erect a naval stores laboratory, locations in Georgia and Florida to be considered. Units will include a boiler house and machine shop.

WASHINGTON—Col. U. S. Grant III, room 1056 New Navy building, is in charge of construction of an 8-story federal supply warehouse, 214 x 498 feet, to be built between C and D and Seventh and Eighth streets. Lockwood Greene Engineers Inc., 100 East Forty-second street, New York, is consulting engineer. Plans will be ready about June 1. Cost is estimated at $1,750,000.

NEW ORLEANS—Charles Melhado, 1621 Audubon avenue, is president of a company planning the manufacture of an internal combustion heating plant unit here.

BALTIMORE — F. A. Hunnewell, United States Coast Guards, treasury department, has plans in progress for construction of a boat shop building at the coast guard depot at Curtis Bay.

COLUMBIA, S. C.—State highway department, Ben M. Sawyer chief commissioner, is reported to have let contracts for the construction of maintenance shops at Darlington, S. C., to H. P. Little & Son, Conway, S. C.; to Tucker & Sikes, Monroe, S. C., for shops at Edgefield and Florence, S. C.; and to Mimmons-Adams Lumber Co., Seneca, S. C., for a shop at Seneca.

NASHVILLE, TENN.—John Deere Plow Co., Moline, Ill., is reported to plan construction of a warehouse and assembly unit here. Estimated cost, $85,000.

HAMPTON ROADS, VA.—Bureau of supplies and accounts, navy department, Washington, will receive bids April 21 on schedule 5513 for one air-driven forging hammer; on April 28 on schedule 5524 for one milling machine; and on schedule 5529 for one electric furnace for heat treating aluminum alloy. Bids will be received May 5 on schedule 5538 for one 21-inch sliding head drill press and on schedule 5540 for one engine lathe.

Missouri

PERRYVILLE—City council is considering construction of a municipal light and power plant at a cost of approximately $90,000.

Texas

BEAUMONT—City will build an administration building and an 80 x 116-foot hangar unit at city airport. Irby & Woodside, architects, Goodhue building, are preparing plans.

BEEVILLE—Central Power & Light Co., San Antonio, Tex., will build a pumphouse here and install a centrifugal pump with capacity of 500 gallons per minute.

HOUSTON—Houston division of the state highway department, James Douglas engineer, is erecting a machine shop for repair of road equipment on property recently acquired here. Principal equipment has been secured.

SAN ANTONIO—L. W. Fox, director of vocational education, advises that equipment will be required for the vocational school now being planned. Machining, welding and sheet metal work will be included in the instruction. (Noted April 9.)

TEXARKANA—Carpenter Welding & Machine Co. will rebuild its plant, recently damaged by fire. Loss was estimated at $12,000.

TEXARKANA—City council has let contract to J. S. Friede and Howard Webb for construction of a hangar at municipal airport.

Wisconsin

CEDARBURG — Hi-Way Alarm Co. has been organized here by G. M. Rix to manufacture a new type of electrical burglar alarm system of the automatic signal device type.

EAU CLAIRE—LaCrosse Refrigerator Co., LaCrosse, Wis., manufacturer of steel boxes and cabinets, has leased the plant of the Cold Storage Refrigerator Co. here, for expansion of production. A. H. Samuel, president, will supervise production here as well as at LaCrosse.

MADISON—State board of control, A. W. Bayley secretary, state capitol, will receive bids April 24 for new equipment, including stamping presses, conveyors, enameling furnaces and similar items for installation in a shop at the state prison.

MANITOWOC—Eastman Mfg. Co., 1002 North Eleventh street, manufacturer of hose couplings, is building two shop additions, 40 x 40 and 20 x 20 feet, and is making other alterations, at a cost of about $25,000 with equipment.

RACINE—Froney Electrocut Inc. has been incorporated by Dr. M. A. Froney, E. L. Christensen and Paul Jorgenson to manufacture and sell an electrically operated machine for cutting vegetables.

WAUPUN—Don V. Smith, Lake Mills, Wis., is sponsor of a proposal to establish a plant for the manufacture of farm machinery in the state prison here. Legislature has adopted a joint resolution for investigation.

Minnesota

CANNON FALLS—Municipalities Gas Corp., Minneapolis, is reported to plan construction of a hydroelectric plant near here. Cost is estimated at $200,000.

South Dakota

ABERDEEN—Deere & Webber Co., D. P. Schutz vice president, 800 Washington avenue north, Minneapolis, proposes to build a 2-story warehouse and shop building here. Plans are being prepared. Estimated cost, $30,000.

Iowa

DES MOINES—Wheeling Corrugating Co., Wheeling, W. Va., local offices at Washington street and Twentieth avenue east, have let contract for erection of a shop for the manufacture of metal culverts and other specialties, to be built at Seventh street and Raccoon avenue. Structure will be 60 x 80 feet.

Idaho

JEROME—Arthur Wise is reported to be in the market for placer mining equipment.

Utah

LOGAN—City electric light department will receive bids for a 600-kilowatt diesel engine unit for installation in the municipal light and power plant. Estimated cost, $65,000.

Pacific Coast

FRESNO, CALIF.—City, H. S. Foster clerk, will receive equipment bids in connection with waterworks improvements. Three deep well turbine pumps are included.

LOS ANGELES—Los Angeles Gas & Electric Co., 810 South Flower street, has private plans for erection of a substation on West Thirty-sixth street. Cost is estimated at $60,000.

LOS ANGELES—Novel Mfg. Co. Ltd., 3705 West Pico street, has started production of metal specialties. Electric tool equipment is being manufactured. C. E. P. Hall is president.

MARE ISLAND, CALIF.—Bureau of supplies and accounts, navy department, Washington, will receive bids April 28 on schedule 5500 for one boring, drilling and milling machine, for delivery to the navy yard here.

OAKLAND, CALIF.—G. E. Wollgren, 1083 Jones avenue, plans to build a 25 x 40-foot machine shop.

OAKLAND, CALIF.—Art Tool & Die Works, 1020 Sixtieth street, plans to build a 1-story machine shop at Sixtieth street near Idaho street. Unit will be 25 x 90 feet.

PITTSBURG, CALIF.—National Silica Products Co., 605 Market street, San Francisco, is considering erection of a plant near here, at a cost of about $150,000.

SEATTLE—Bureau of supplies and

accounts, navy department, Washington, will receive bids April 21 on schedule 5478 for one heat treating furace and on April 28 on schedule 5493 for ⅝-inch drilling machine.

SEATTLE — Olympic Foundry Co., 5200 Ninth avenue, advises through R. E. Kucker that machine shop building now being erected is larger than previously announced, and will be 68 x 75 feet. Cost is estimated at $10,000. (Noted April 2.)

Dominion of Canada

VANCOUVER, B. C.—Ford Motor Co. of Canada Ltd. advises through H. R. Cottingham, branch manager, that property has been purchased here for an assembly plant, as recently noted, but that plans are not complete. Work may not be undertaken this year. W. R. Campbell, with offices in East Windsor, Ont., is president. (Noted March 19.)

NORTH SYDNEY, N. S.—City council proposes to build a municipal light and power plant at a cost of approximately $110,000. F. J. Kelley is chairman of the council.

BELLEVILLE, ONT.—Sargent & Co. Ltd. has been incorporated with $750,000 and 10,000 no par shares by Robert B. F. Barr, 216 Campbell street, Toronto, Ont., to manufacture and deal in hardware, metal products and machinery.

FT. ERIE, ONT.—Stewart Motor Corp., 93 Dewey street, Buffalo, is arranging for Canadian production. Temporary plant has been established here and decision will be made in about five weeks concerning permanent location. (Noted March 19.)

FT. WILLIAM, ONT.—Mahon Electric Co. Ltd. has been incorporated with $200,000 capital by Eastman E. Mahon, to deal in electrical equipment.

INGERSOLL, ONT.—Miles Automatic Furnace Fans Ltd. advises through J. W. Jamieson that the company was organized to manufacture and sell automatic furnace fans and blowers similar to those manufactured by the Warm Air Furnace Fan Co., Cleveland. Plant space has been secured and for the present no machinery will be required. (Noted March 5.)

OAKVILLE, ONT.—Heaters of Canada Ltd. has been incorporated with $500,000 capital by Earl D. Cox to manufacture radiators, steam and hot water heating equipment. Company is reported to plan erection of a plant. A. McNiven, Guelph, Ont., will be manager and Henry McCoy, Hamilton, Ont., engineer.

OTTAWA, ONT.—Moss Mines Ltd., 75 Spark street, has awarded contract for the erection of a mill, to have a daily capacity of 100 tons. Structure will be built in Moss township.

TORONTO, ONT.—John Inglis Co. Ltd. will arrange facilities for the manufacture in Canada of certain products of Bay City Shovels Inc., Bay City, Mich., manufacturer of convertible power shovels, cranes and excavators.

WINDSOR, ONT.—Hupp Motor Car Corp., Detroit, advises through W. S. Graham, vice president in charge of manufacturing, that changes at its local plant are general repairs. Equipment for assembling cars will be a minor item. (Noted April 2.)

MONTREAL, QUE.—Aerocrete Construction Co. Ltd., 2047 Harvard street, has let contract for erection of a plant. Two units, 50 x 100 feet and 100 x 150 feet, will be built. Cost is estimated at $75,000.

MONTREAL, QUE.—Knapp Brothers Ltd. has been incorporated with 1000 no par shares by Maurice Dugal, 275 St. James street west, to manufacture and deal in hardware and machinery.

MONTREAL, QUE.—Montreal Light, Heat & Power Consolidated Ltd., 107 Craig street, is erecting a substation addition on Atwater avenue at a cost of approximately $500,000. Company will build a substation at Lambert, Que., and a compressor station at Ville LaSalle, Que., latter to cost $40,000. Company's engineering department will be in charge.

New Trade Publications

SYNCHRONOUS MOTORS—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in Leaflet 20519 describes its Type HR synchronous motors. They are designed for driving low-speed, constant-speed machinery where low starting current combined with high starting and pull-in torque is required. The leaflet discusses application, construction and operation. Photographs, drawings and curves illustrate the text.

MACHINING OPERATIONS—Four bulletins, No. 60 to 63, inclusive, issued by the Gisholt Machine Co., Madison, Wis., present actual performance in various machining operations on its machine tools. Operations included are: Machining conical faces, balancing, turning chuck bodies, machining alloy steel screws. A tool grinding chart has also been published by this company, giving dial settings for 33 tools for general purpose work.

PULLEYS AND SHEAVES—Henry Lindahl Foundry & Machine Co., Chicago, has issued Catalog No. 24, covering its line of pulleys and sheaves. Full information is given, the pulleys are illustrated and dimensions and prices are included.

AUTOMATIC CONTROLS—A catalog, No. 8008 has been published by the Brown Instrument Co., Philadelphia, on its automatic control devices for temperatures, pressures, flows, liquid levels and other factors. It illustrates how temperature controls can be applied to all types of furnaces, kilns, ovens and other equipment using any type of fuel

GRINDING—A booklet by the Norton Co., Worcester, Mass., treats of grinding and heat treatment as causes of cracks in hardened steels. Illustrations show effects of improper treatment in these respects and the remedy is pointed out.

LUBRICATION—In its current publication on lubrication the Texas Co., New York, takes up the subject with application to marine steam propulsive machinery and reciprocating steam engines. Illustrations are from representative installations.

FLOOR ARMORING—A. O. Smith Corp., Milwaukee, has issued a bulletin on its type of floor armoring, designed to increase life of composition floors under heavy wear. Illustrations show its application.

BOILER EFFICIENCY—A bulletin by the Joseph Harrington Co., subsidiary of the Whiting Corp., Harvey, Ill., presents a report on boiler tests conducted at the recent Midwest Power show at Chicago. It covers performance of a boiler operated on western coal screenings. The stoker used was the Whiting type, automatic, over-feed, slide-grate.

TESTING LABORATORY—Pittsburgh Testing Laboratory, Pittsburgh, has issued a brochure commemorating its fiftieth anniversary. It is illustrated to show the staff and equipment, as well as the class of research covered by its activities. A feature is its inspection service on structural work, railroads, pipe, pavements, power plants and other lines.

HARD-FACING PRODUCTS—Armite Laboratories, Los Angeles, has issued a bulletin describing its hard-facing products for application on friction surfaces by electric arc or oxyacetylene methods. These are in various forms for a wide variety of uses.

ROLLER CHAIN—Simplifying and improving machine design is the subject matter of a booklet by the Diamond Chain & Mfg. Co., Indianapolis. It presents eight classes of transmission application where chain drives are of particular importance to designers. Each class is described and its practical application shown.

GASKETS—Akron Metallic Gasket Co., Akron, O., has issued a catalog, No. 31, showing principal types of gaskets, with particular reference to higher pressures which have necessitated improvement in these devices. Full descriptions and prices are given.

CONDUIT FITTINGS—Appleton Electric Co., Chicago, in Bulletin 901 lists and illustrates its various types of malleable outlets for rigid conduit and couplings, connectors and clamps for use with threadless thin-wall conduit.